AN ASSESSMENT OF SEARCH AND RESCUE

FOR EAST COAST OFFSHORE EXPLORATION DRILLING OPERATIONS

ANNEXES

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ANNEXES

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ANNEX A

TABLE A-1

BEAUFORT SCALE WITH CORRESPONDING WIND VALUES

BEAUFORT NUMBER	KNOTS	MILES PER HOUR
0	0	0
1	1- 3	1- 3
2	4- 6	4- 7
3	7-10	8-12
4	11-16	13-18
5	17-21	19-24
6	22-27	25-31
7	28-33	32-38
8	34-40	39-46
9	41-47	47-54
10	48-55	55-63
11	56-63	64-73
12	64-71	74-83

TABLE A-2

THE SEASTATE SCALE

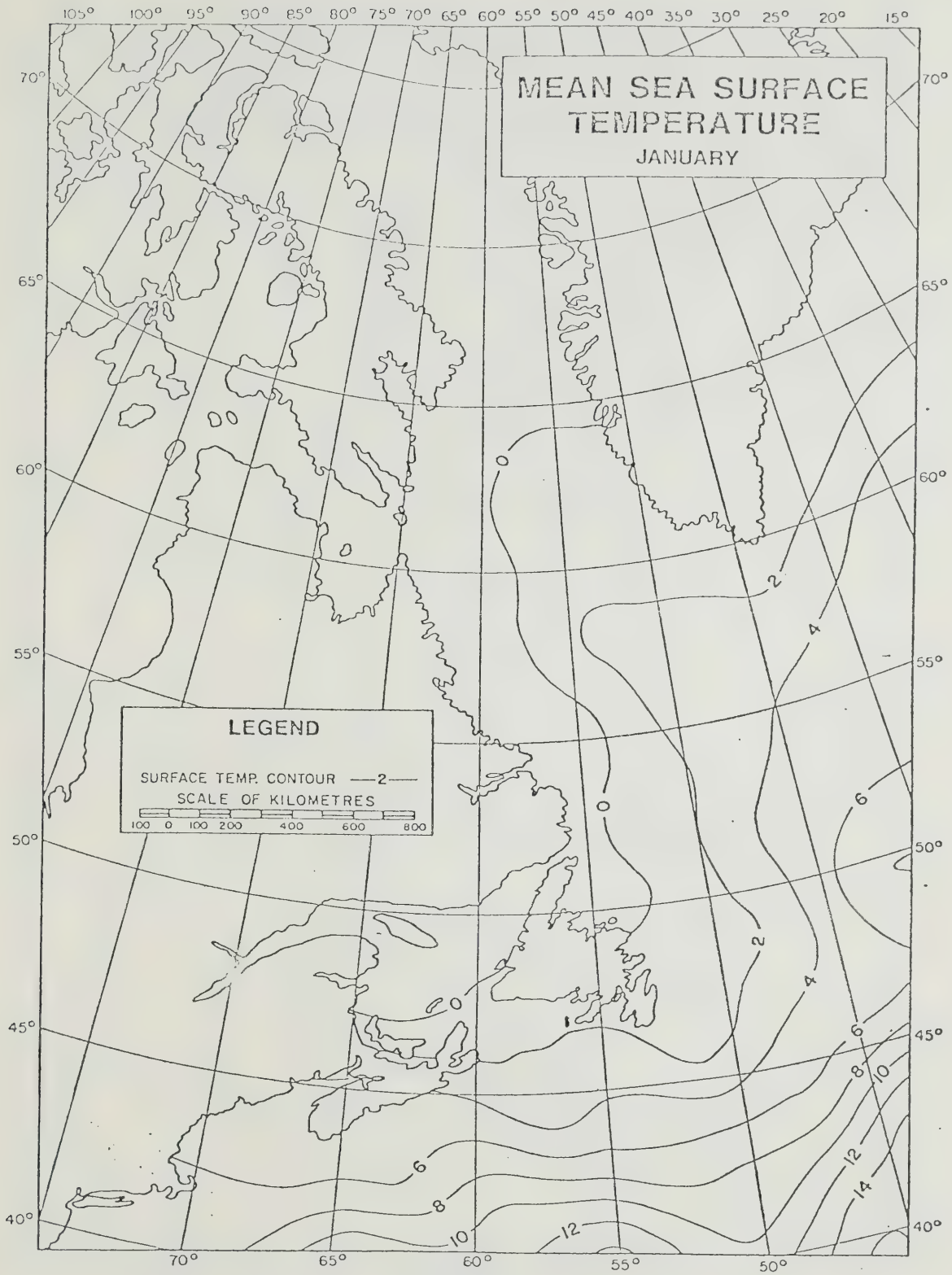
SCALE NUMBER	BRITISH DESIGNATION	MEAN MAX WAVE HEIGHT (FEET)	U.S. DESIGNATION	MEAN MAX WAVE HEIGHT (FEET)
0	calm (glassy)	0	calm	0
1	calm (rippled)	0- 1	smooth	1
2	smooth (wavelets)	1- 2	slight	1- 3
3	slight	2- 4	moderate	3- 5
4	moderate	4- 8	rough	5- 8
5	rough	8-13	very rough	8-12
6	very rough	13-20	high	12-20
7	high	20-30	very high	20-40
8	very high	30-45	mountainous	>40
9	phenomenal	>45	confussed	

TABLE A-3

MEAN SEA SURFACE TEMPERATURE °C

LOCATION

	A	B	HIBERNIA	C	D	E	F	G
JANUARY	4.5	4.5	3.0	8.0	4.5	6.0	6.0	10.0
FEBRUARY	4.0	3.5	1.8	6.5	3.0	4.5	4.5	8.0
MARCH	4.0	3.5	1.8	6.0	3.0	4.0	4.0	8.0
APRIL	4.5	4.0	2.2	7.0	4.0	5.0	5.0	9.0
MAY	6.0	6.0	4.0	9.0	6.0	7.0	7.0	11.0
JUNE	7.5	7.5	6.0	11.5	9.0	10.5	10.5	15.0
JULY	10.5	11.0	10.5	16.0	14.0	15.0	15.0	19.0
AUGUST	13.0	14.0	13.5	19.0	17.5	18.5	18.5	21.0
SEPTEMBER	12.0	13.5	13.0	18.5	16.5	17.5	17.5	20.0
OCTOBER	9.0	11.0	10.0	16.0	13.5	14.5	14.5	17.0
NOVEMBER	7.5	8.5	7.0	13.0	10.0	13.0	13.0	15.5
DECEMBER	6.0	6.0	4.5	10.0	6.5	8.0	8.0	12.0
LOW	4.0	3.5	1.8	6.0	3.0	4.0	4.0	8.0
HIGH	13.0	14.0	13.5	19.0	17.5	18.5	18.5	21.0


MEAN SEA SURFACE TEMPERATURE
JANUARY
LEGEND
SURFACE TEMP. CONTOUR —2—
SCALE OF KILOMETRES
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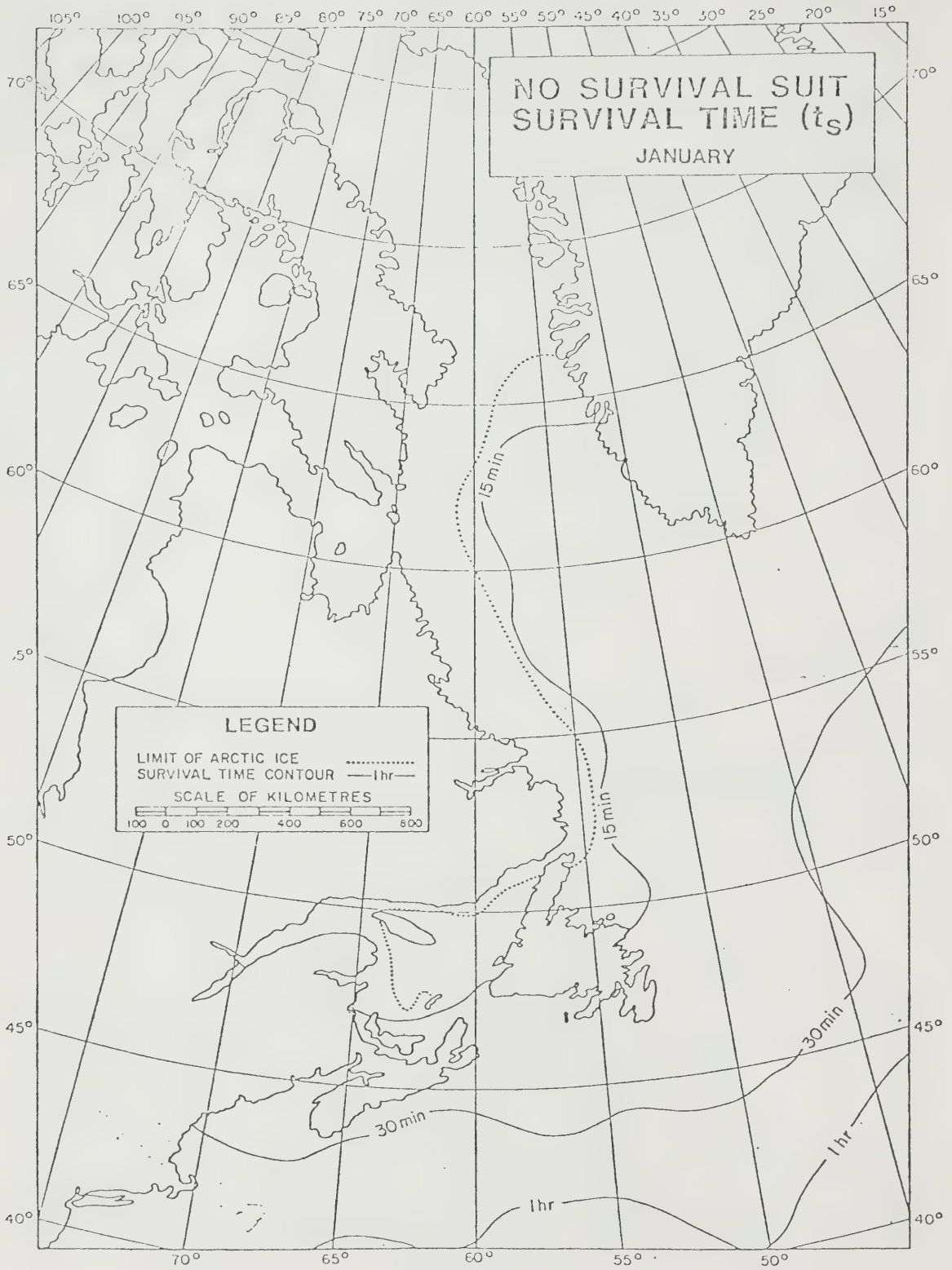
70° 65° 60° 55° 50° 45° 40°
0 2 4 6 8 10 12 14

Figure A-1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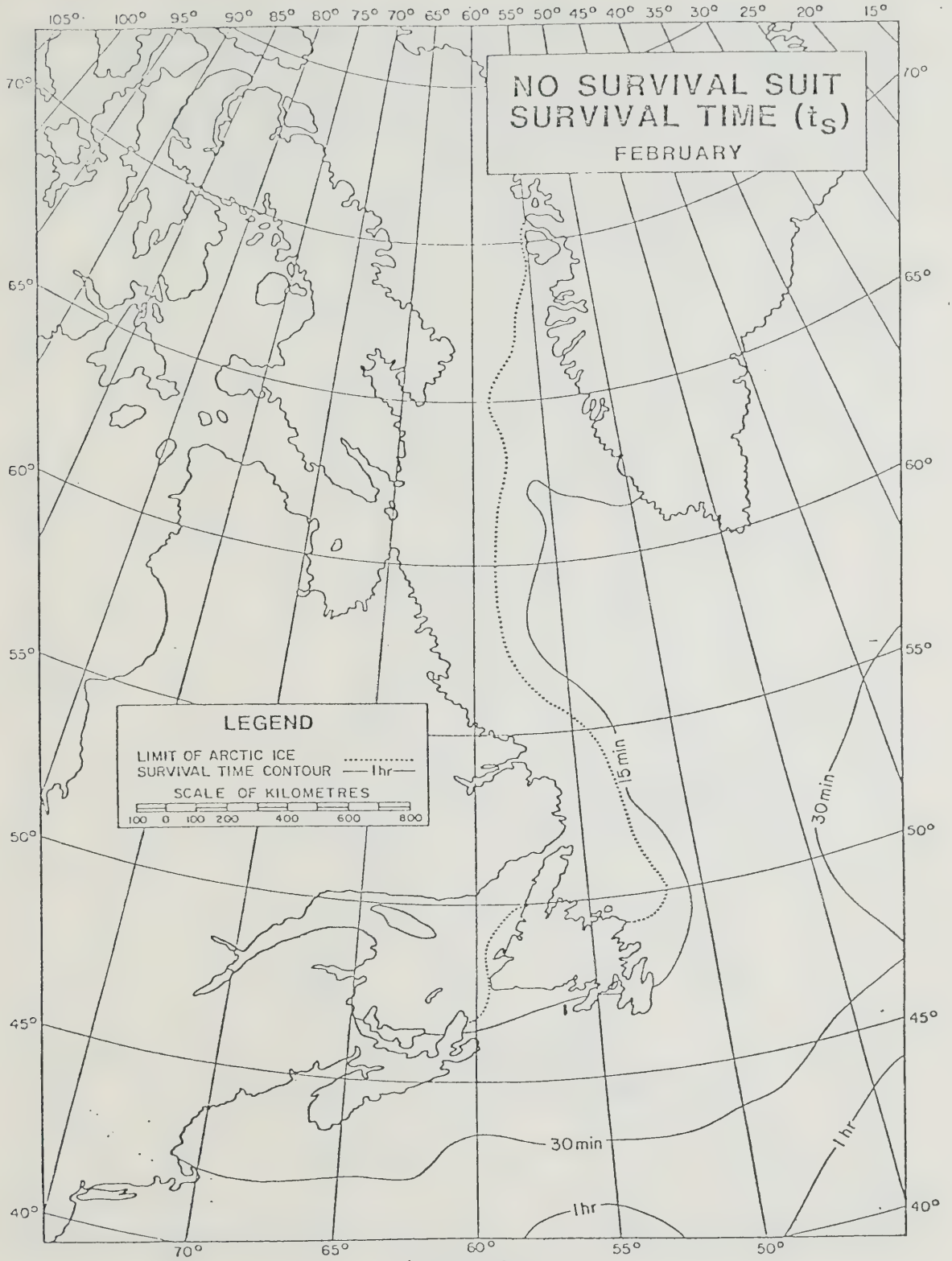
SURVIVAL TIME (t_s)
JANUARY
LEGEND
LIMIT OF ARCTIC ICE
SURVIVAL TIME CONTOUR —1hr—
SCALE OF KILOMETRES
100 0 100 200 400 600 800
15min
15min
30min
30min
1hr
1hr
105° 100° 95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 35° 30° 25° 20° 15°
70° 65° 60° 55° 50° 45° 40°

Figure A-2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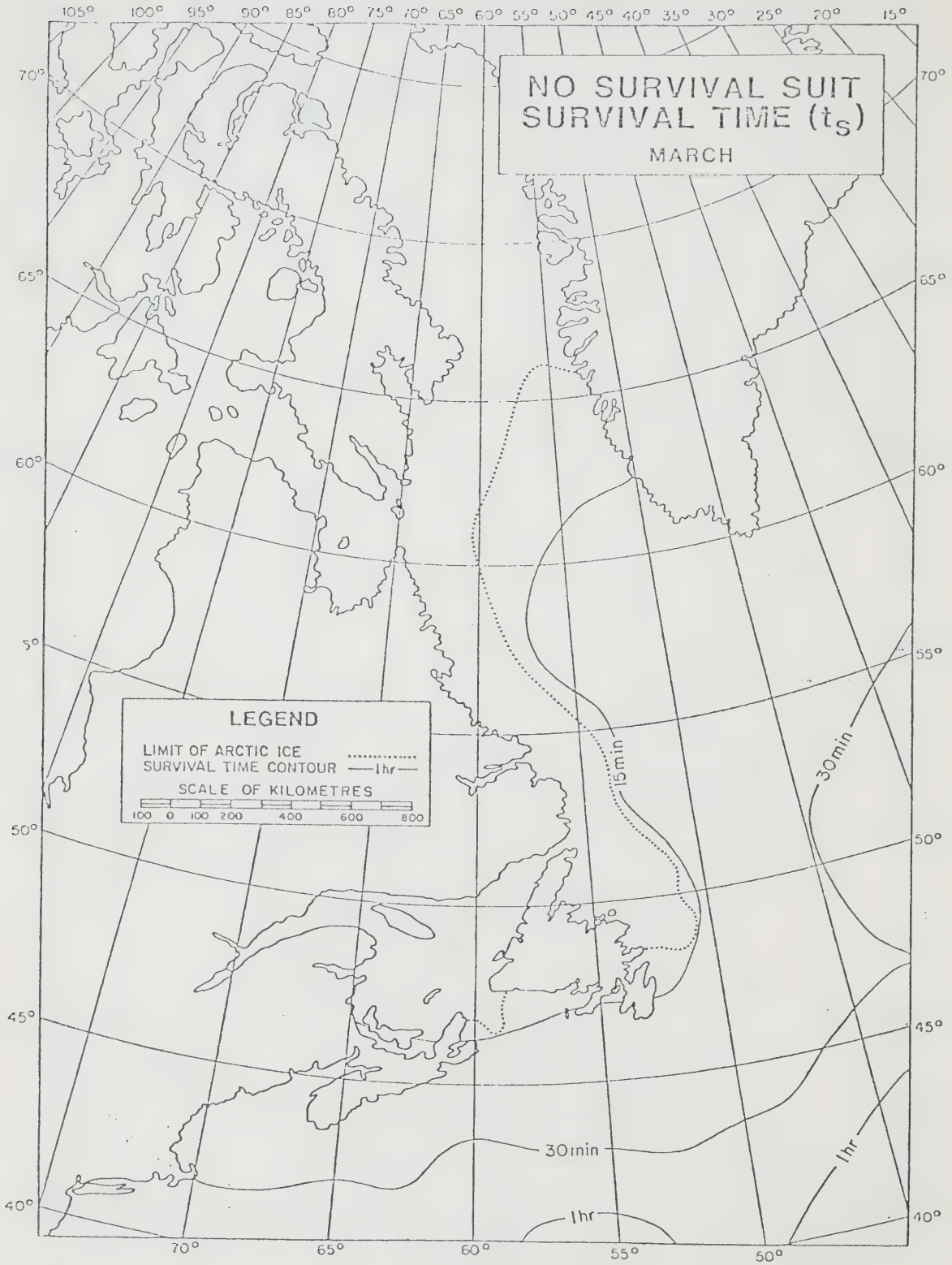
SURVIVAL TIME (t_s)
FEBRUARY
LEGEND
LIMIT OF ARCTIC ICE
SURVIVAL TIME CONTOUR —1hr—
SCALE OF KILOMETRES
100 0 100 200 400 600 800
15 min
30 min
30 min
1 hr
1 hr
105° 100° 95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 35° 30° 25° 20° 15°
70° 65° 60° 55° 50° 40°

Figure A-3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MARCH
LEGEND
LIMIT OF ARCTIC ICE
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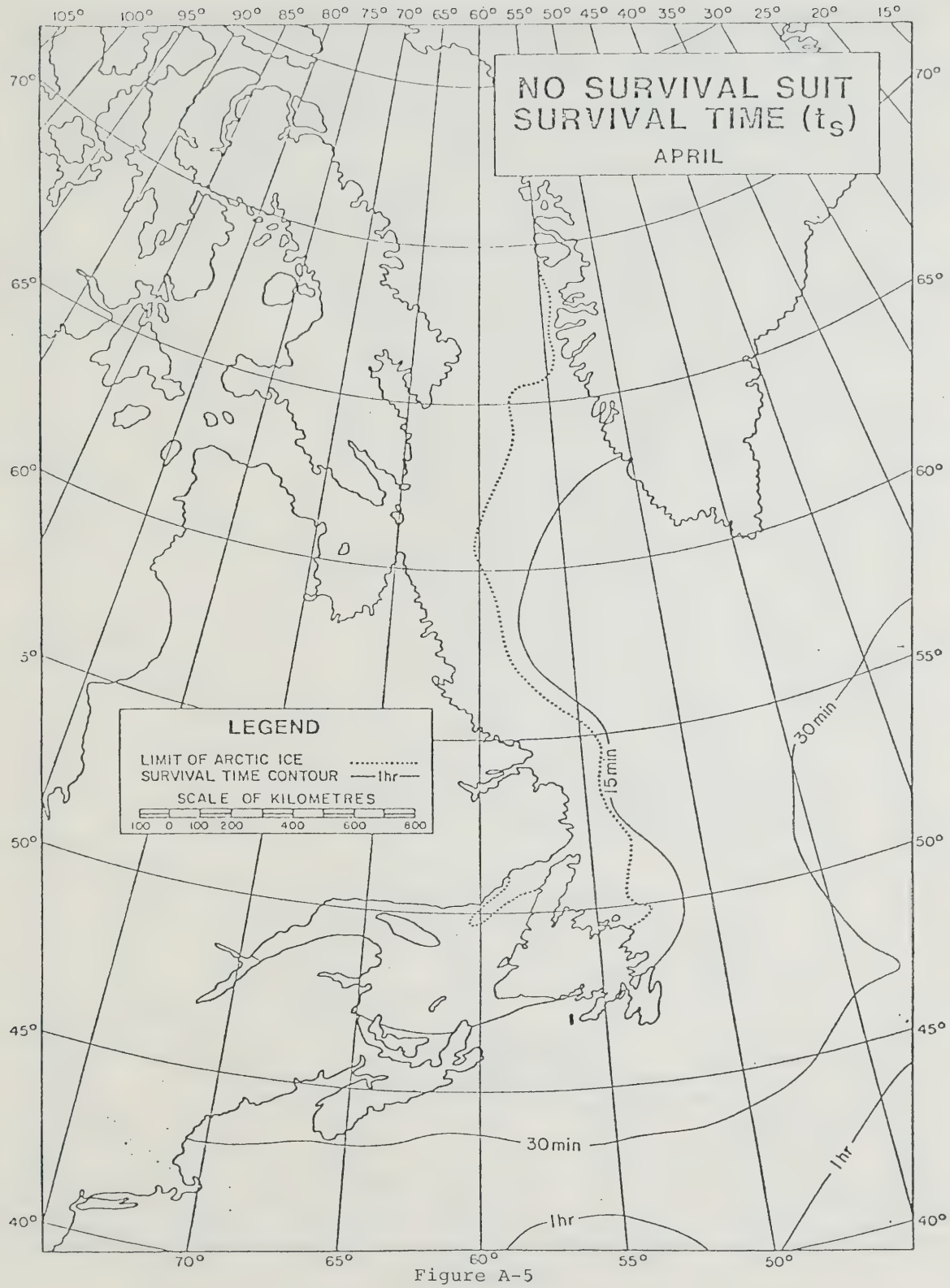
SCALE OF KILOMETRES
100 0 100 200 400 600 800
15min
30min
30min
1hr
1hr
105° 100° 95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 35° 30° 25° 20° 15°
70° 65° 60° 55° 50° 45° 40°
70° 65° 60° 55° 50°

Figure A-4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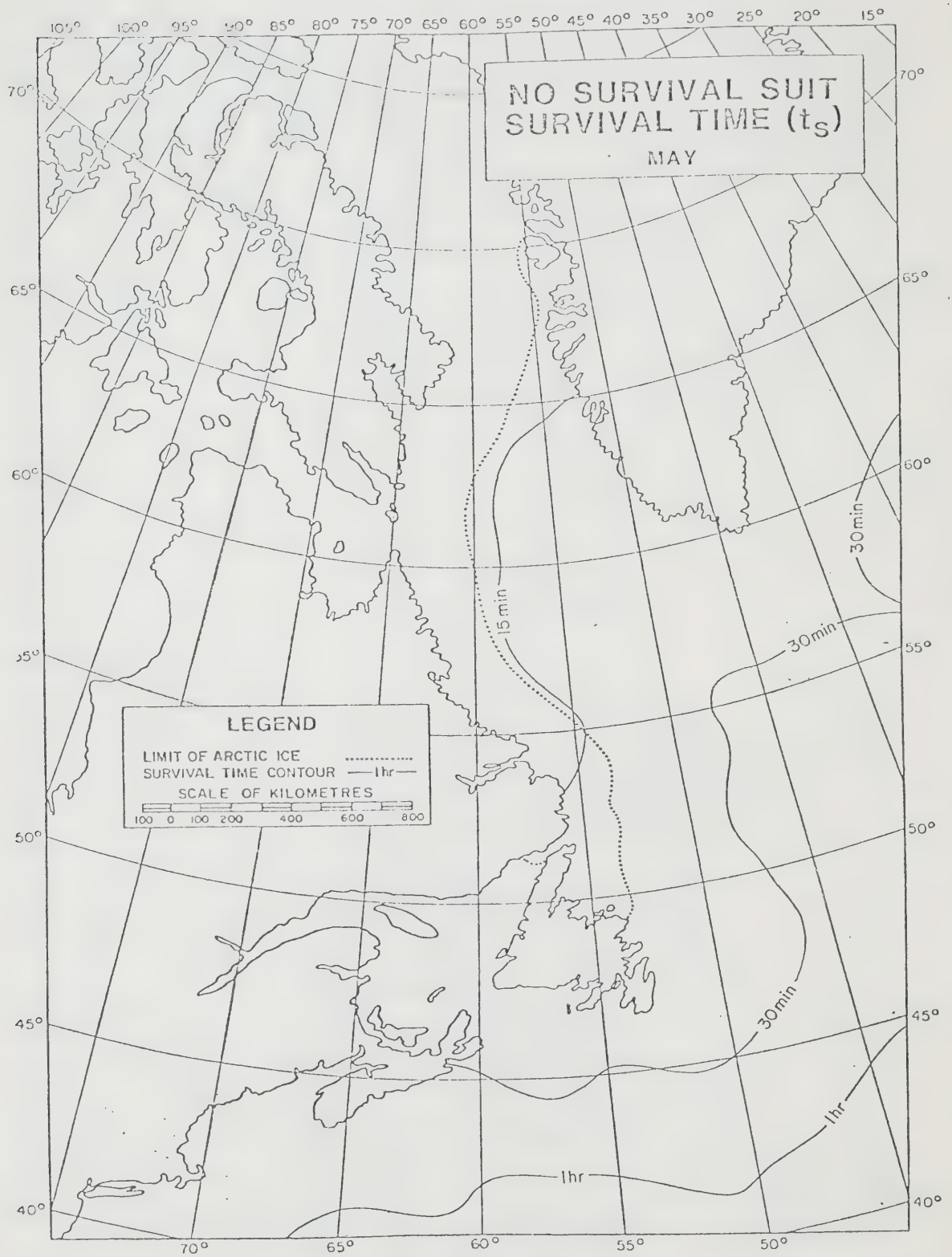
SURVIVAL TIME (t_s)
APRIL
LEGEND
LIMIT OF ARCTIC ICE
SURVIVAL TIME CONTOUR —1hr—
SCALE OF KILOMETRES
100 0 100 200 400 600 800
15min
30min
30min
1hr
1hr
105° 100° 95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 35° 30° 25° 20° 15°
70° 65° 60° 55° 50° 40°

Figure A-5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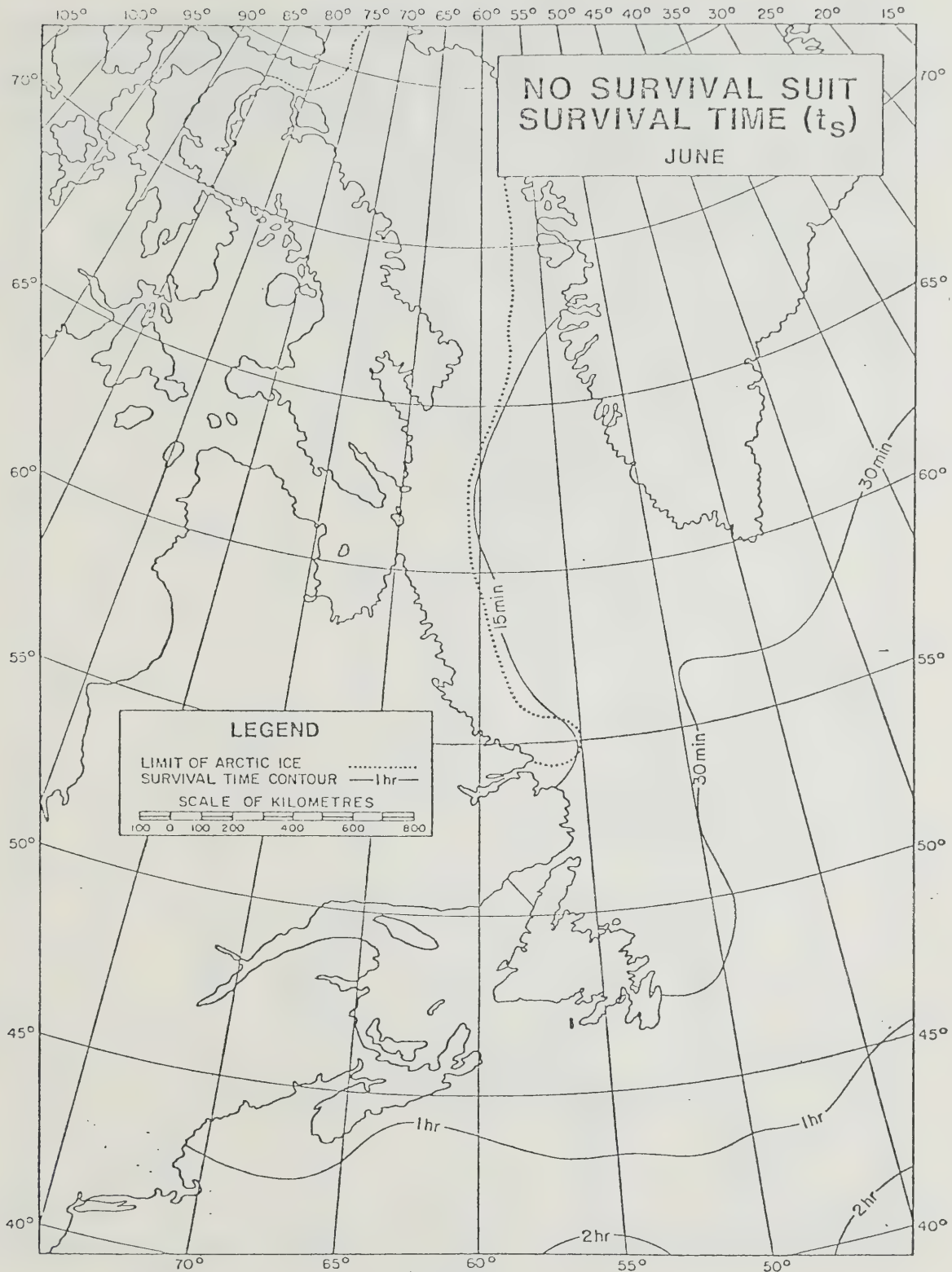
MAY
LEGEND
LIMIT OF ARCTIC ICE
SURVIVAL TIME CONTOUR —1hr—
SCALE OF KILOMETRES
100 0 100 200 400 600 800
15 min
30min
30min
30min
1hr
1hr
105° 100° 95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 35° 30° 25° 20° 15°
70°
65°
60°
55°
50°
45°
40°

Figure A-6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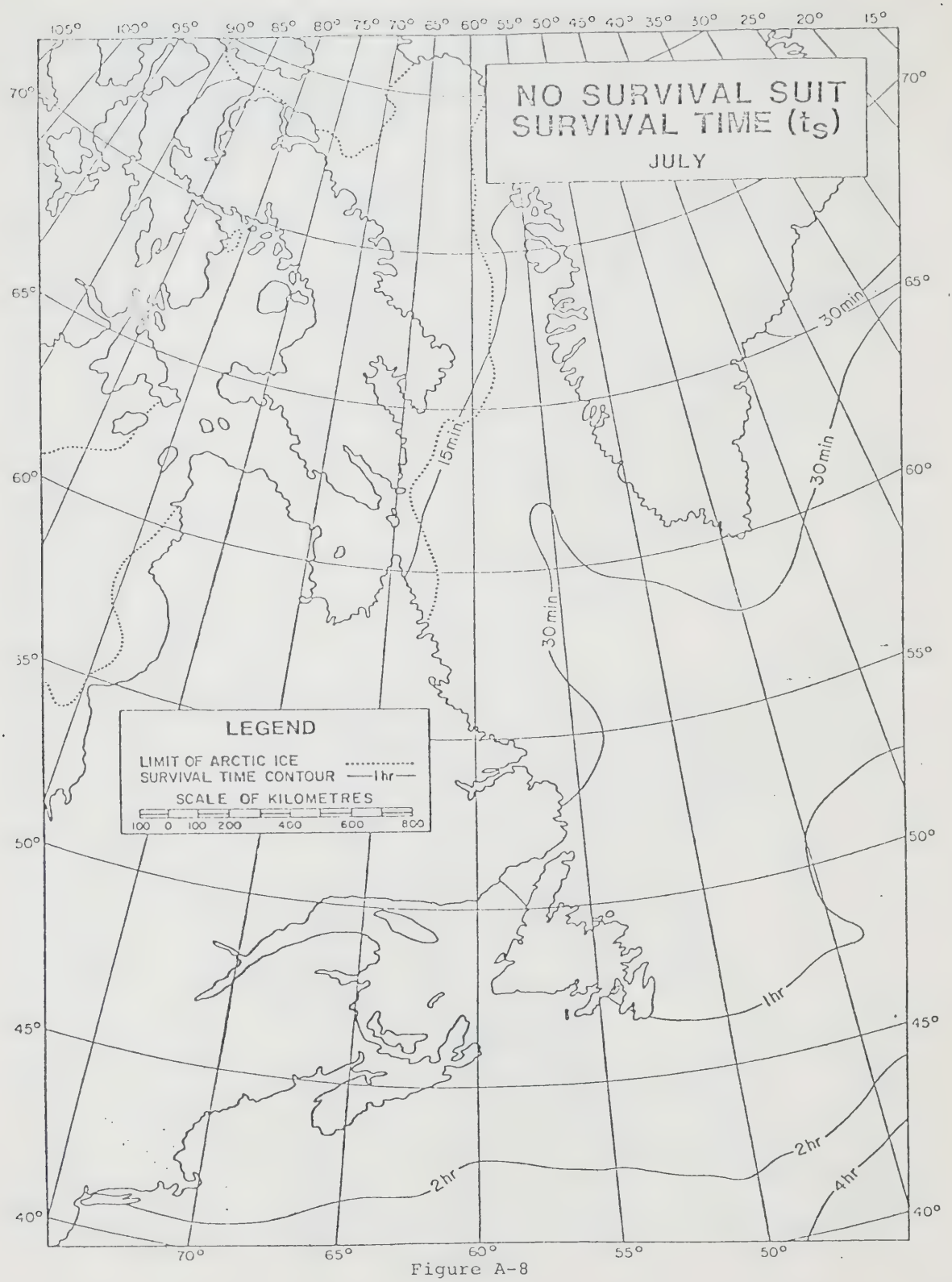
JUNE
LEGEND
LIMIT OF ARCTIC ICE
SURVIVAL TIME CONTOUR —1hr—
SCALE OF KILOMETRES
100 0 100 200 400 600 800
15min
30min
30min
1hr
1hr
2hr
2hr
105° 100° 95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 35° 30° 25° 20° 15°
70° 65° 60° 55° 50° 45° 40°

Figure A-7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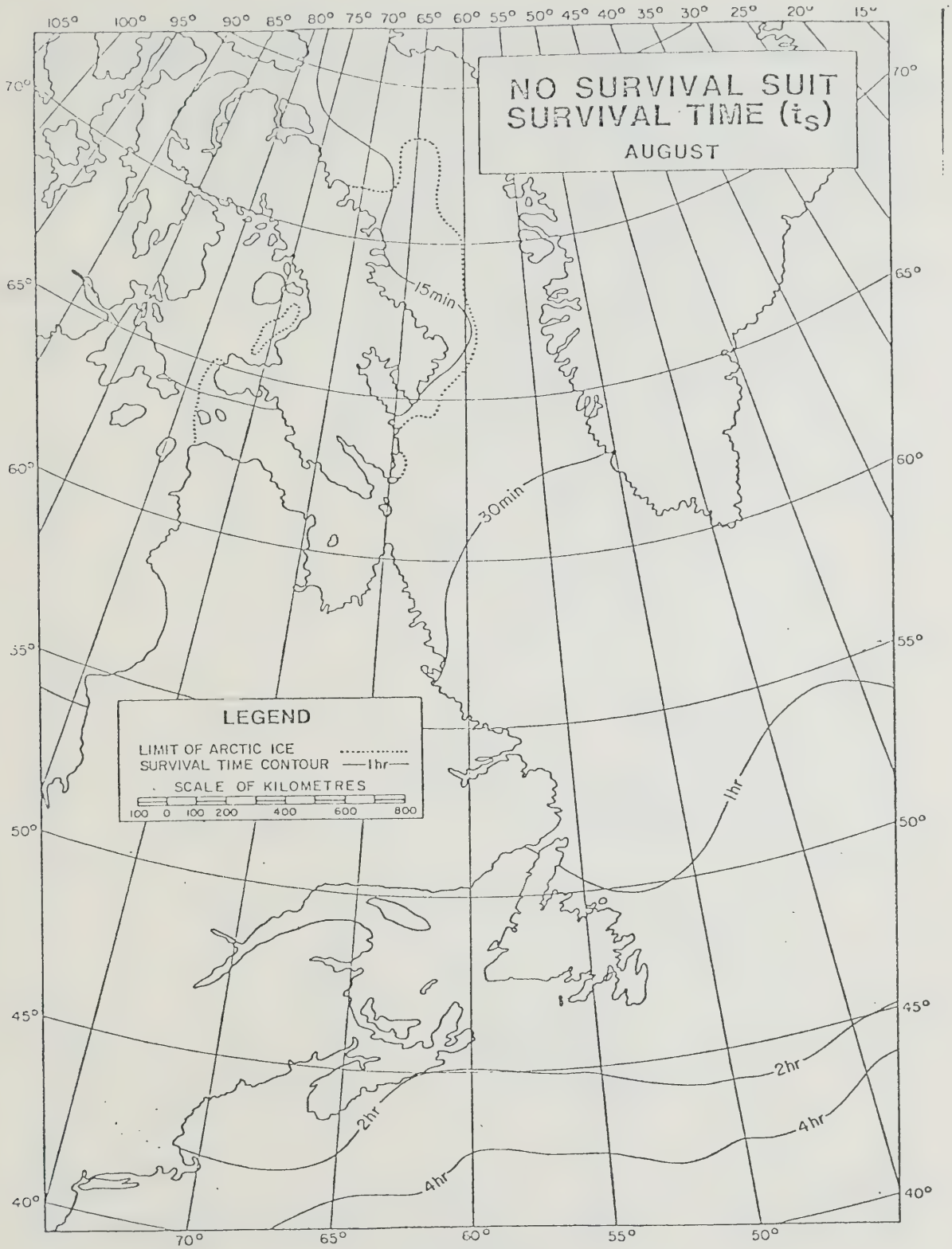
SURVIVAL TIME (t_s)
JULY
LEGEND
LIMIT OF ARCTIC ICE
SURVIVAL TIME CONTOUR —1hr—
SCALE OF KILOMETRES
100 0 100 200 400 600 800
15min
30min
30min
30min
1hr
2hr
2hr
4hr
105° 100° 95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 35° 30° 25° 20° 15°
70° 65° 60° 55° 50° 45° 40°
70° 65° 60° 55° 50°

Figure A-8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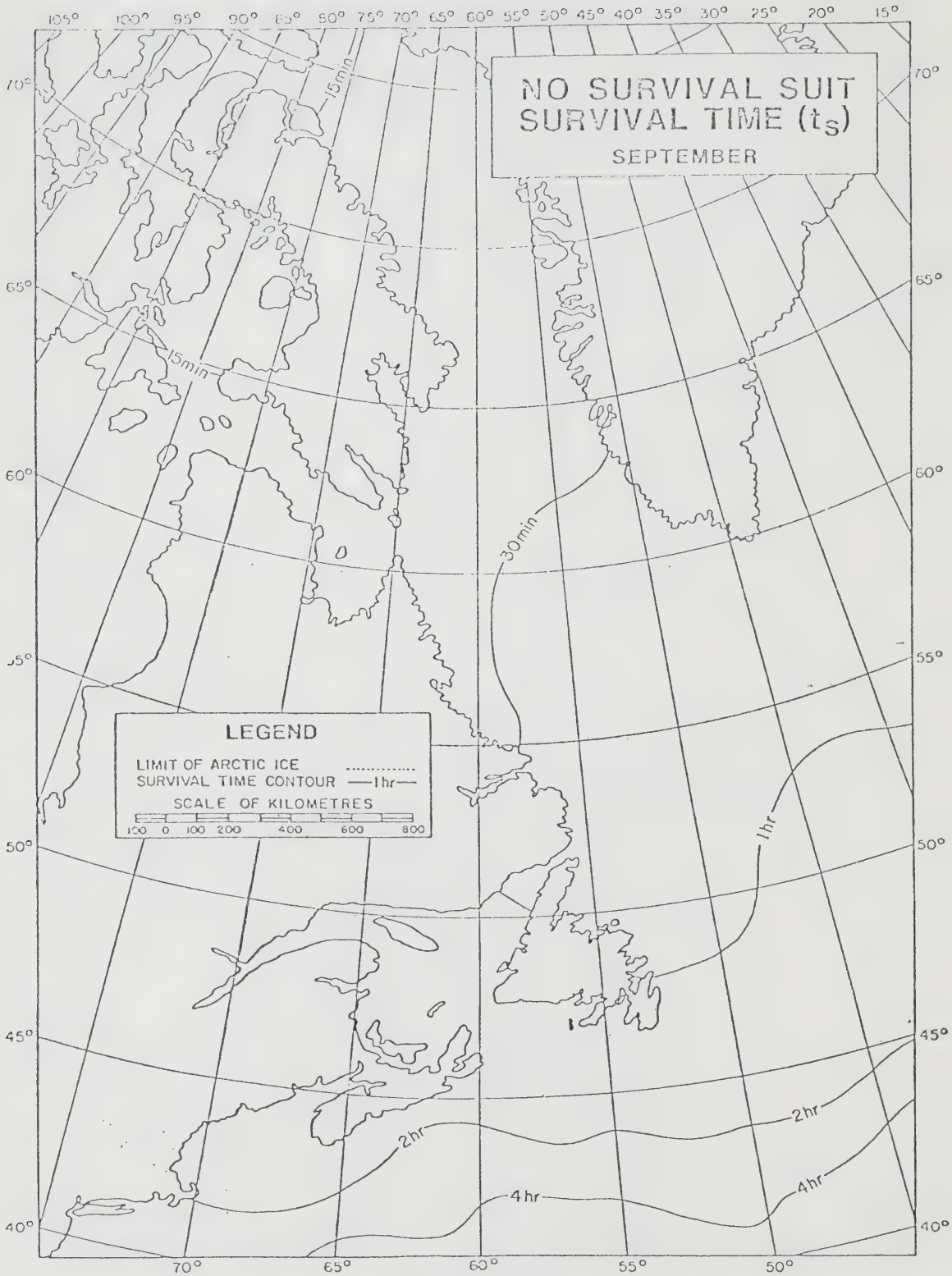
SURVIVAL TIME (t_S)
AUGUST
LEGEND
LIMIT OF ARCTIC ICE
SURVIVAL TIME CONTOUR —1hr—
SCALE OF KILOMETRES
100 0 100 200 400 600 800
15min
30min
1hr
2hr
4hr
105° 100° 95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 35° 30° 25° 20° 15°
70° 65° 60° 55° 50° 45° 40°

Figure A-9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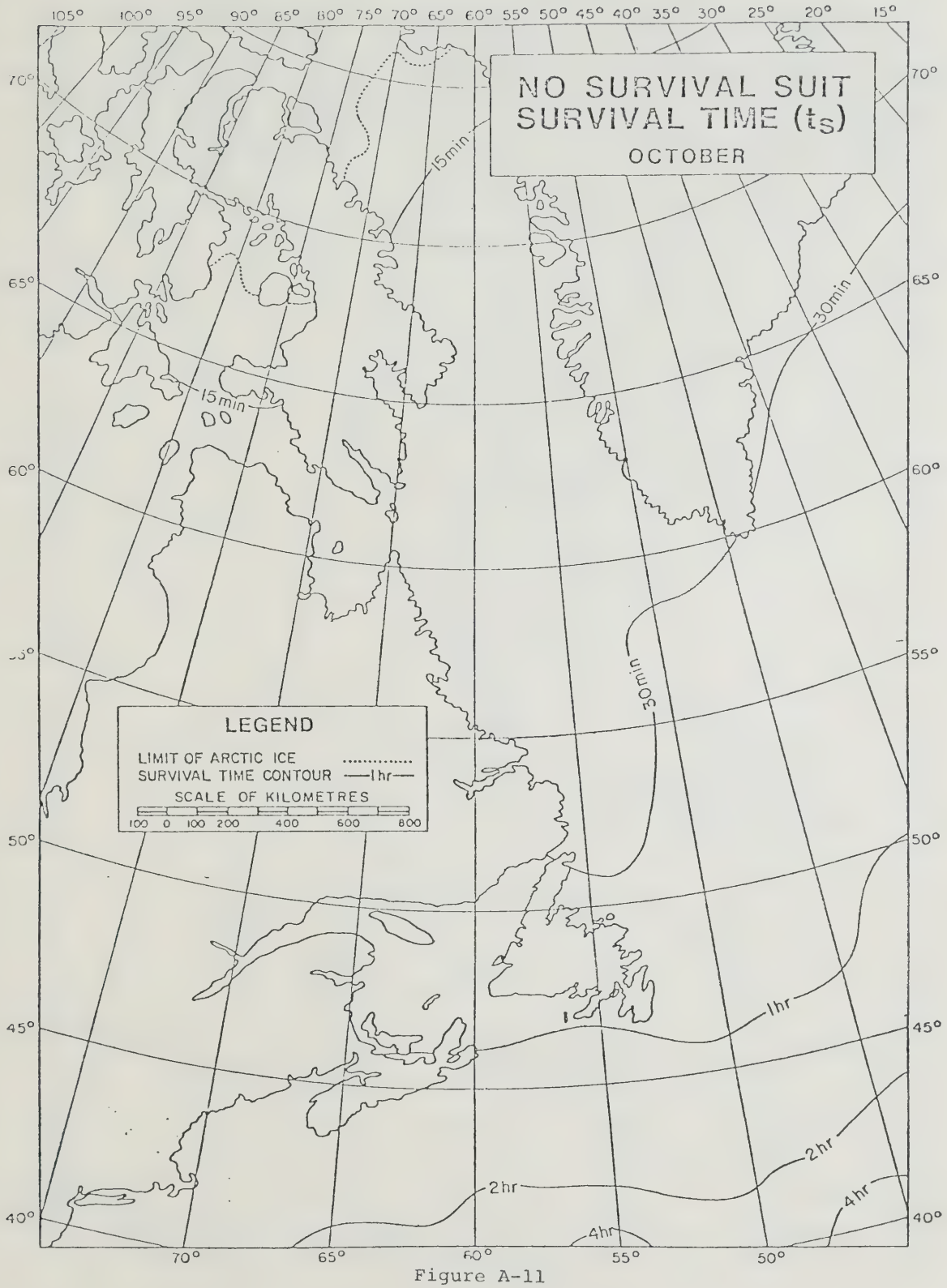
SURVIVAL TIME (t_s)
SEPTEMBER
LEGEND
LIMIT OF ARCTIC ICE
SURVIVAL TIME CONTOUR —1hr—
SCALE OF KILOMETRES
100 0 100 200 400 600 800
15min
15min
30min
1hr
2hr
2hr
4hr
4hr
105° 100° 95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 35° 30° 25° 20° 15°
70°
65°
60°
55°
50°
45°
40°
70° 65° 60° 55° 50°

Figure A-10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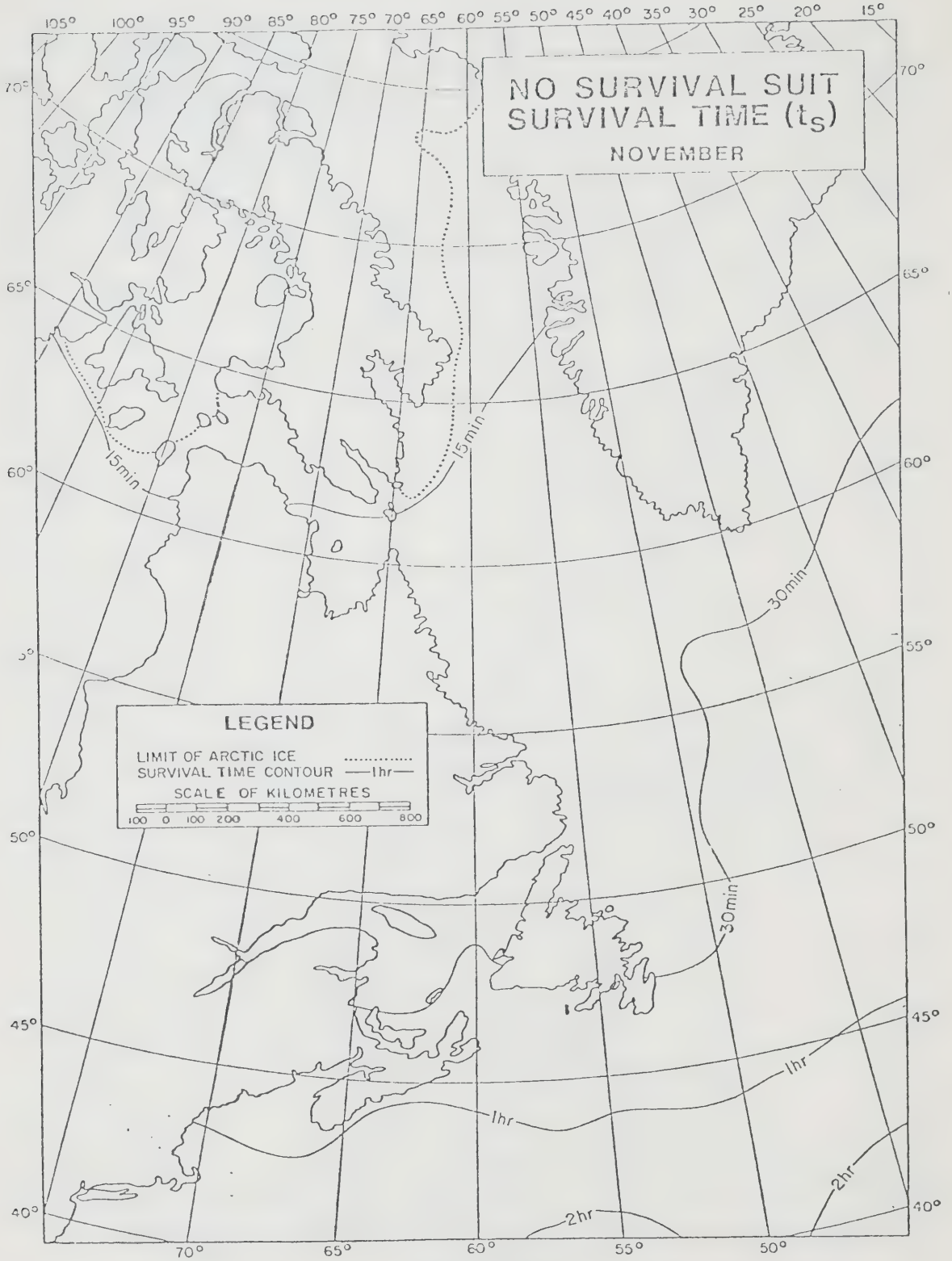
SURVIVAL TIME (t_S)
OCTOBER
LEGEND
LIMIT OF ARCTIC ICE
SURVIVAL TIME CONTOUR —1hr—
SCALE OF KILOMETRES
100 0 100 200 400 600 800
15min
15min
30min
30min
1hr
2hr
2hr
4hr
4hr
105° 100° 95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 35° 30° 25° 20° 15°
70° 65° 60° 55° 50° 45° 40°

Figure A-11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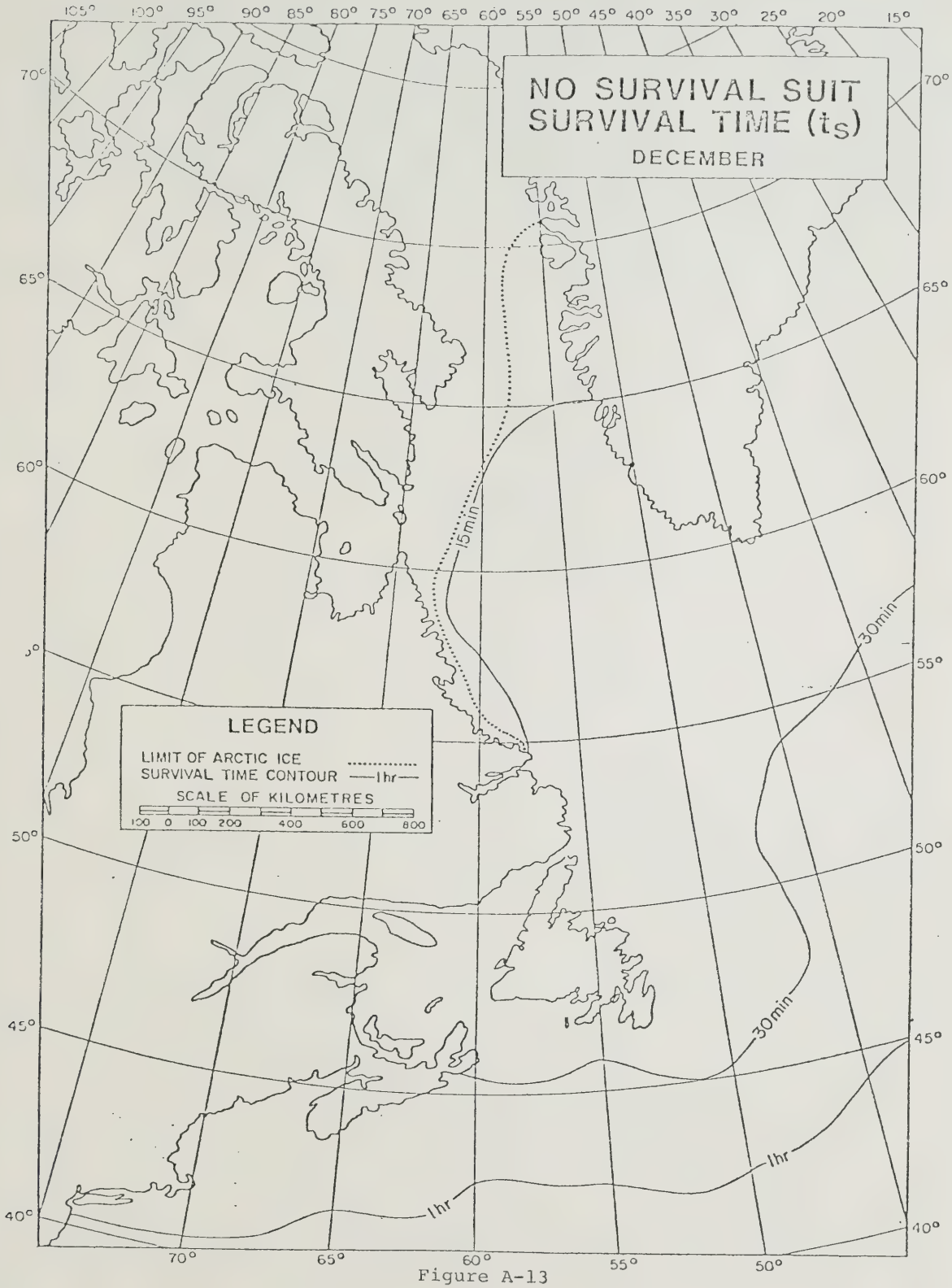
SURVIVAL TIME (t_s)
NOVEMBER
LEGEND
LIMIT OF ARCTIC ICE
SURVIVAL TIME CONTOUR —1hr—
SCALE OF KILOMETRES
100 0 100 200 400 600 800
15min
15min
30min
30min
1hr
1hr
2hr
2hr
105° 100° 95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 35° 30° 25° 20° 15°
70° 65° 60° 55° 50° 45° 40°
70° 65° 60° 55° 50°

Figure A-12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SURVIVAL TIME (ts)
DECEMBER
LEGEND
LIMIT OF ARCTIC ICE
SURVIVAL TIME CONTOUR —1hr—
SCALE OF KILOMETRES
100 0 100 200 400 600 800
15min
30min
30min
1hr
1hr
105° 100° 95° 90° 85° 80° 75° 70° 65° 60° 55° 50° 45° 40° 35° 30° 25° 20° 15°
70° 65° 60° 55° 50° 45° 40°

Figure A-13

ANNEX B

PRE-PUBLICATION

ISSUE OF

PROVISIONAL STANDARD 65-GP-16MP

FOR

INSULATED BUOYANT IMMERSION SUITS

This provisional standard applies to immersion suits that are designed to prevent shock upon entering cold water and to lessen the effect of hypothermia (body heat loss during long periods of immersion) and to provide flotation for the wearer while in the water.

It has not been reviewed by a Technical Committee of the Canadian Government Specifications Board nor has it been formally ratified by the Board.

It is provided in this form for interim use pending its publication as a formal bilingual standard.

Price
$3.00

CANADIAN GENERAL STANDARDS BOARD

Standard for

INSULATED BUOYANT IMMERSION SUITS

NOTE: The third draft of 65-GP-16M contains the same information as the pre-publication issue of 65-GP-16MP (May 1980) as amended by Amendment No. 1 (October 1980).

1. SCOPE

1.1 This standard applies to immersion suits that are designed to prevent shock upon entering cold water and to lessen the effect of hypothermia (body heat loss during long periods of immersion) and to provide flotation for the wearer while in the water. This standard includes approval procedures, construction and performance requirements and approval tests.

1.2 Appendix A describes the Personal Buoyant Safety Device Light which is for use as a component of the immersion suit.

2. APPLICABLE PUBLICATIONS

2.1 The following publications are applicable to this standard:

2.1.1 Canadian General Standards Board (CGSB)

1-GP-12C	Standard Paint Colours
54-GP-1	Stitches, Seams and Stitchings
62-GP-12	Marking Material, Retroreflective, Enclosed Lens, Flexible Type.

2.1.2 Underwriters Laboratories' Inc. (UL)

UL 1191	Components for Personal Flotation Devices
UL 1197	Exposure Suits.

2.1.3 American Society for Testing and Materials (ASTM)

B 117	Salt Spray (Fog) Testing
C 177	Steady-State Thermal Transmission Properties by Means of the Guarded Hot Plate

C 518 Steady-State Thermal Transmission Properties by Means of Heat Flow Meter.

D 1004 Initial Tear Resistance of Plastic Films and Sheeting

2.1.4 U. S. Federal Specifications

No. 191 Textile Test Methods

*No. 751a Stitches, Seams and Stitchings

* Identical in technical content and nomenclature with CGSB 54-GP-1 (par. 2.1.1)

2.1.5 U. S. Department of Transportation, Coast Guard Federal Register

Part 160 Life Saving Equipment

Part 161 Electrical Equipment

2.2 Reference to the above publications is to the lastest issue unless otherwise specified by the authority applying this standard.

3. CLASSIFICATION

3.1 This standard applies to immersion suits of the following sizes:

3.1.1 Adult size I - for minimum body weights of 50 kg and maximum body weights in the range 118 ± 9 kg and for body heights in the range 1500 to 1900 mm.

Adult Size II - Custom Made - for body weights outside the range of Adult Size I Suits and made as agreed between purchaser and supplier for body weights and heights.

Note: All immersion suits regardless of size shall meet the requirements of the standard.

3.1.2 Child Size - for body weights in the range 20 to 50 kg and for body heights in the range 1000 to 1500 mm.

4. GENERAL REQUIREMENTS

4.1 The immersion suit shall be constructed primarily of a closed-cell flexible foam that meets the requirements of this standard to provide the thermal insulation and buoyancy. The buoyancy materials shall not be loose or granular.

4.2 The immersion suit shall be designed to cover the wearer's entire body, except for the area of the nose and eyes.

4.3 The exterior of the immersion suit shall be resistant to tearing and abrading.

4.4 The immersion suit shall not be adversely affected by sea water and oil.

4.5 The immersion suit shall be rot proof, corrosion and sunlight resistant.

4.6 Storage Case - Each suit shall be supplied with a storage case made of vinyl coated cloth or equivalent material that provides protection to the suit.

5. DETAIL REQUIREMENTS

5.1 Construction Details

5.1.1 Body Strength - The body of the suit shall be designed so that it is not damaged when tested for Impact (par. 8.1.3.12) and Body Strength (par. 8.1.10).

5.1.2 Seams - The stitching used in each structural seam of the suit shall be lock type stitching that meets the requirements of 54-GP-1 for:

Class 300	Lockstitch
Class 400	Multithread Chain Stitch
Class 700	Single Thread Lockstitch.

5.1.3 Seam Strength - Each seam shall have a seam strength of at least 225 N when tested as described in par. 8.1.11.

5.1.4 Closures and Seals - Each closure and seal shall be designed so that the suit meets the water retention requirement par. 5.2.7.

5.1.5 Hardware - All hardware of the suit shall be of a size and design that allows ease of operation by the wearer. The hardware shall be attached to the suit in a manner that allows ease of operation by the wearer and that prevents it from attaining a position that allows improper use.

5.1.5.1 Corrosion Resistance of Metal Parts - Each metal part of the survival suit shall be -

a. 410 stainless steel or have salt water and salt air corrosion characteristics equal or superior to 410 stainless steel when tested for corrosion resistance as described in par.8.1.9

and shall be

b. galvanically compatible with each other metal part with which it is in contact.

5.1.6 Color of Suit Exterior - The primary color of the exterior surface of the suit shall be approximately Orange 508-101 or Red 509-101 of CGSB 1-GP-12c.

5.1.7 Buoyant Compartment - The suit shall not have an inflated or inflatable compartment except as prescribed in par. 5.2.2.2.

5.1.8 Hand and Arm Construction - The hand area of the suit shall be either gloves or mittens that allow sufficient dexterity for the wearer to pic: up a wooden pencil not more than 10 mm in diameter from a table and write with it (par. 8.1.3.4). The gloves or mittens may be removeable if they are attached to the arm and when not in use, they are secured t: the sleeve. Removeable gloves or mittens shall be designed so that onl: a small amount of water can enter the hand area during use. Each arm with removeable gloves or mittens shall have a wristlet seal that meets par. 5.1.4.

5.1.9 Leg Construction - The suit shall have the following leg construction:

a. A foot with a hard sole or enough room for a work shoe to be worn inside. The sole area of the foot shall be natural or synthetic rubber that is ribbed or embossed for skid resistance. The sole shall prevent the wearer from slipping when the suit is tested as described in par. 8.1.3.5.

b. A means to prevent air from becoming entrapped in the leg when the wearer enters the water head first when tested as described in par. 8.1.3.11.

5.1.10 Wearing Comfort and Mobility - The suit shall be capable of being worn comfortably over clothing, but shall not be bulky and shall not restrict the wearer's motion. The suit size and design shall allow successful completion of the following mobility tests:

Donning Time, tested as described in par. 8.1.3.2

Field of Vision, tested as described in par. 8.1.3.3

Hand Dexterity, tested as decribed in par. 8.1.3.4

Walking, tested as described in par. 8.1.3.5

Climbing, tested as described in par. 8.1.3.6

Water Emergence, tested as described in par. 8.1.3.7

5.1.11 Retroreflective Material - The suit shall be fitted with retroreflective material that meets 62-GP-12. When the wearer of an exposure suit is in each of the face-up stable floating positions described in par. 5.2.2.1 and 5.2.2.2 at least 20 000 mm^2 of the material shall be visible above water to an observer at water level directly;

a. in front of the wearer; and

b. behind the wearer.

5.1.12 Tear Resistance - The average tearing strength of each material described in the test procedure must be not less than 45 N when tested as described in par 8.1.11.4.

5.1.13 Abrasion Resistance - The residual breaking strength of each material described in the test procedure after abrasion shall not be less than 225 N when tested as described in par. 8.1.11.5.

5.1.14 Personal Buoyant Safety Device Light - Each immersion suit shall be designed so that a safety light meeting the requirements described in Appendix A can be attached on or above the front shoulder area of the suit without damage to the suit and without adversely affecting the performance of the suit. If the manufacturer designates a specific location for the light this information must be clearly printed on the suit or in the instructions prescribed in par. 6.3.

5.2 Performance Requirements

5.2.1 Corrected Buoyancy - The corrected buoyancy of the adult suit shall be not less than 125 N and the corrected buoyancy of the child size suit shall be not less than 58 N after 24 h immersion in fresh water when measured as described in par. 8.1.7.3 and corrected as described in par. 8.1.7.5. In addition the suits shall retain not less than 95% of the original measured buoyancy after 24 h immersion in fresh water when tested as described in par. 8.1.7.4.

5.2.2 Floating Characteristics

5.2.2.1 The suit shall have a stable floating position between upright and horizontal in which the wearer is face-up with mouth and nose at least 100 mm above the surface of the water when tested as described in par. 8.1.3.8.

5.2.2.2 If this stable floating position is horizontal or nearly so, an auxiliary means of buoyancy such as an inflatable bladder shall be provided to change the stable floating position. When testing the suit with the auxiliary means of buoyancy, as described in par. 8.1.3.8, the stable floating position shall be upright, inclined slightly backward, or shall be a feet-up sitting position.

5.2.2.3 The buoyancy of any auxiliary means of buoyancy shall not be counted when determining the corrected buoyancy of the suit (par. 5.2.1).

5.2.2.4 Righting - The suit shall turn the wearer from a face-down position to a face-up position within 10 s or to allow the wearer without assistance to turn himself from a face-down position to a face-up position within 5 s. If a suit has an auxiliary means of buoyancy, the suit shall be designed to meet this requirement when the auxiliary means of buoyancy is used and when it is not used. The righting tests are carried out as described in par. 8.1.3.9.

5.2.3 Thermal Protection - The suit shall provide such thermal protection that the average body core (rectal) temperature of persons wearing the suit for 6 h in calm circulating water that is between 0°C and 2°C shall not drop more than 2°C and the average finger or toe skin temperature of the wearers shall not drop to less than 5°C in the thermal protection test as described in par. 8.1.4.

5.2.4 Insulation - The thermal conductivity of the suit material shall be less than or equal to that of a control sample of 4.75 mm thick closed-cell neoprene foam when they are submerged to a depth of 1 m in water and when tested as described in par. 8.1.5. The control sample of neoprene foam shall have a thermal conductivity of not more than 0.050 W/(m· °K) as determined by ASTM C 177 or C 518.

5.2.5 Donning Time - The suit shall be designed so that a person can don the suit correctly, par. 8.1.3.2, within 1 min after reading the donning and use instructions described in par. 8.1.3.2.

5.2.6 Field of Vision - The suit shall be designed to allow unrestricted vision throughout an arc of 60° to either side of the wearer's straight ahead line of sight when the wearer's head is turned to any angle between 30° to the right and 30° to the left. Each suit shall be designed to allow a standing wearer to move his head and eyes up and down far enough to see both his feet and a spot directly overhead when tested as described in par. 8.1.3.3.

5.2.7 Water Retention - The immersion suit shall be constructed so that entry of water inside the suit will not exceed 5 kg in 1 h immersion in calm water when tested as described in par. 8.1.3.10.

5.2.8 Splash Protection - The suit shall have a means to prevent water spray from directly entering the wearer's mouth.

5.2.9 Storage Temperature - The suit shall be designed so that it will not be damaged by storage in its storage case (par. 4.6) at any temperature between minus 30°C and plus 65°C, when tested as described in par. 8.1.6.

5.2.10 Flame Resistance - Both the immersion suit and the storage case shall be designed to be usable after 2 s contact with a gasoline fire, when tested as described in par. 8.1.8.

6. INSTRUCTIONS FOR USE

6.1 The suit shall have instructions for its donning and use. The instructions shall be in both official languages and must not exceed 50 words. Illustrations shall be used in addition to the written instructions.

6.2 The instructions shall be on the exterior of the storage case or printed on a waterproof card attached to the storage case or to the suit. These instructions shall also be available in a form suitable for mounting on a bulkhead in a vessel.

6.3 In addition to instructions for donning and using the suit, each suit shall have instructions on care and repair of the suit and any relevant information concerning the suit including the operation and attachment of the personal buoyant safety device light.

7. APPROVAL PROCEDURE

7.1 General - An immersion suit may be approved by the Canadian Coast Guard Ship Safety Branch if it meets the construction and performance requirements of this standard.

7.1.1 Approval - Approval of a device signifies that at least three prototypes have been submitted for testing and found to comply with the relevant standard, and signifies an agreement between the approval authority and the manufacturer of the device to a continuing system of inspection (paragraph 10). In addition to the above, the manufacturer shall provide the testing laboratory with sufficient prototypes for the mobility and flotation tests.

7.1.2 Acceptance of Immersion Suits Which Are Already In Service - An insulated immersion suit in use on a vessel before the effective date of this standard may remain in use on the vessel in place of a Canadian Coast Guard approved insulated immersion suit, providing the manufacturer of the suit verifies by affidavit that the construction components and performance characteristics of the suit are equal or superior to a suit approved under the provisions of this standard.

7.2 Application for Approval - An application for approval of an immersion suit shall be sent to the Director, Ship Safety Branch, Canadian Coast Guard, Transport Canada, 11th Floor, Tower A, Place de Ville, Ottawa, Ontario, K1A 0N7.

7.3 Contents of Application - An application for approval of an immersion suit shall include the following:

7.3.1 Three sets of plans describing the suit.

7.3.1.1 Each set of plans shall include the following:

An assembly drawing or general arrangement drawing.

Detailed drawings showing components of the suit.

A detailed description of the quality control procedure used in producing the suit.

A copy of the instructions described in par. 6.

7.3.2 The name of a proposed independent laboratory and a description of the laboratory's qualification to conduct or supervise approval tests.

7.3.3 An approval test plan describing in detail the proposed test procedures, apparatus, and facilities.

7.4 Testing Arrangements - The applicant shall make arrangements for the approval tests directly with the independent laboratory. Each approval test shall be conducted in accordance with this standard.

7.5 Independent Laboratory

7.5.1 The approval and production test of this standard shall be conducted by or under the supervision of an independent laboratory.

7.5.2 To be an independent laboratory, a laboratory shall

a. be engaged in inspection and testing marine materials and equipment; and

b. not be owned or controlled, by a manufacturer or vendor of immersion suits, or by a supplier of materials to the manufacturer.

7.6 Submission of Test Report and Plans - After the approval tests are completed, the applicant shall send the test report and three sets of plans to the Director, Ship Safety Branch, Canadian Coast Guard, Transport Canada, 11th Floor, Tower A, Place de Ville, Ottawa, Ontario, Canada , K1A 0N7.

7.7 Final Review and Approval - The Canadian Coast Guard reviews the test report and the plans and advises the applicant whether the immersion suit is approved.

8. TESTING

8.1 Approval Testing For Adult Size Immersion Suit

CAUTION: During each of the in-water tests prescribed in this section, a person ready to render assistance when needed should be near each subject in the water.

8.1.1 General - Each adult size immersion suit shall be tested as described in this section. If the suit is also made in a child size, the child size suit shall be tested as described in par. 8.2.

8.1.2 Test Samples - Each test prescribed in this section shall be performed using as many identical exposure suits as are needed to make efficient use of the test subjects and test equipment, except that each subject in the Impact Test in par. 8.1.3.12, shall have one suit for the entire test.

8.1.3 Mobility and Flotation Tests - The mobility and flotation capabilities of each immersion suit shall be tested under the following conditions and procedures:

8.1.3.1 Test Subjects - The subjects used in the test described in this paragraph shall be seven males and three females selected to represent each of the three physical types (ectomorphic, endomorphic and mesomorphic). Each subject shall be in good health. The heaviest male subject shall weigh at least 25 kg more than the lightest male subject. The heaviest female subject shall weigh at least 25 kg more than the lightest female subject. Each subject shall be unfamiliar with the specific suit under test. Each subject shall wear a swimming

suit for the in-water tests and ordinary street clothing or work clothing for the other tests.

8.1.3.2 Donning Time - Each subject is removed from the view of the other subjects and allowed 1 min to examine the suit and the manufacturer's instructions for donning and using the suit. At the end of this period, the subject attempts to don the suit as rapidly as possible without the aid of a chair or any support to lean on; however, the subject may sit on the floor. If the subject does not don the suit completely, including gloves or mittens and any other accessories, within 60 s, the subject removes the suit, examines the instructions fo another minute, and again attempts to don the suit. At least nine of the ten subjects shall be able to don the suit completely in 60 s in at least one of the two attempts.

8.1.3.3 Field of Vision - The immersion suit's field of vision shall be tested as follows:

a. While wearing the suit, each subject shall stand upright facing straight ahead. Position an observer to one side of the subject, 60° away from the subject's straight ahead line of sight. The observer shall be able to see the subject's closest eye at this position. The observer then walks in front of the subject to a position on the subject's other side 60° away from his straight ahead line of sight. The suit shall not obstruct the observer's view of the subject's eyes at any point between the two positions.

b. While wearing the suit, each subject stands upright facing straight ahead. An observer is positioned to one side of the subject, 90° away from the subject's straight ahead line of sight. The subject then turns his head through an arc of 30° toward the position of the observer. This procedure is repeated with the observer 90° to the other side of the subject's straight ahead line of sight. The suit shall not obstruct the observer's view of the subject's eyes when the subject's head is turned 30° toward the observer.

c. While wearing the suit, each subject stands upright and faces straight ahead. Through a combination of head and eye movement, the subject looks first at a spot directly overhead, then looks at a spot on or between the feet. An observer must verify that the subject can make the necessary head and eye movements while wearing the suit.

8.1.3.4 Hand Dexterity - While wearing the suit with gloves or mitts attached, each subject must be able to pick up a 10 mm diameter wooden pencil from a flat hard surfaced table using only one hand. Still using only one hand, the subject must b able to position the pencil and write with it. At least eigh of the ten subjects must be able to complete this test.

8.1.3.5 Walking - A 30 m long walking course shall be laid out on a smooth linoleum floor. The finish on the floor shall allow water to lie on it in a sheet rather than beads. The course may have gradual turns, but must not have an abrupt change in direction. Each subject is timed walking the course two times at a normal pace with the floor dry. Each

subject then dons the suit and is timed again walking the course two times with the floor wet. The subject is given adequate rest periods between trials to avoid fatique. The subject shall not slip on the wet floor when wearing the suit. The average time for each subject to walk the course shall be not more than 1.25 times the subject's average time to walk the course without the suit.

8.1.3.6 Climbing - A vertical ladder extending a suitable distance above a level floor shall be used for this test. Each subject while not wearing the suit is timed twice climbing the ladder to a rung 5 m above the floor. The subject then dons the suit and is again timed twice climbing to the same rung. The subject is given adequate rest periods between trials to avoid fatigue. The average time for each subject to climb the ladder wearing the suit must be not more than 1.25 times the subject's average time to climb the ladder without the suit.

8.1.3.7 Water Emergence - Use a pool with a wooden platform at one side for this test. The platform shall be 300 mm above the water surface, and shall not float on the water. The platform shall have a smooth painted surface. The subject, while not wearing the suit, enters the water and swims or treads water for approximately 2 min. The subject shall then be able to emerge from the pool onto the platform using only his or her hands on top of the platform as an aid, and without pushing off of the bottom of the pool. Any subject unable to emerge onto the platform within 30 s is disqualified for this test. At least five subjects

Must qualify and be used for this test. If less than 5 subjects of the original 10 (par. 8.1.3.1) qualify, substitute may be made. Each qualified subject dons the suit with all closures open and without any auxiliary means of buoyancy. The subject then enters the water feet first and swims or treads water for 2 min. During this period, he or she allows water to enter the suit, but does not attempt to flood the suit to its maximum capacity. After the 2 min period, the subject secures all of the suit closures. The subject must then be able to emerge from the pool onto the platform, using only his or her hands on top of the platform as an aid, and without pushing off the bottom of the pool.

8.1.3.8 Stability and Retro-reflective Material Visibility - While wearing the suit in water without any auxiliary means of buoyancy, the subject assumes a face-up position and then allows his or her body to become limp. The distance from the water surface to the lowest part of the mouth or nose is measured. This procedure is repeated using the auxiliary means of buoyancy, if one is provided. For each test subject, the stable position and the distance of the mouth and nose above the water, are determined. During this test, the subject must be viewed by an observer at water level from the front and from the back to determine the area of retro-reflective material which is visible.

8.1.3.9 Righting - Each subject while wearing the suit in water without any auxiliary means of buoyancy takes a deep breath, assumes a face-down position, allows the body to become limp, and slowly expels air. The suit shall cause the subject to turn face up within 10 s; or if the suit does not turn the subject within 10 s, the subject shall be able to turn face up under his own power within 5 s. The procedure is repeated using the auxiliary means of buoyancy, if one is provided.

8.1.3.10 Water Retention - Each subject is weighed while wearing the completely dry suit without any auxiliary means of buoyancy. The subject jumps into water from the height that will cause the subject to be completely immersed. For approximately 1 h the subject shall float, swim or tread water with short rest periods. During the rest periods the subject shall remain immersed in the water to shoulder height. The subject then emerges from the water and is weighed 10 s after emergence.

8.1.3.11 Air Retention - The procedure for air retention is carried out with the subject entering the water head first. As the subject enters the water air entrapped in the leg must be expelled automatically.

8.1.3.12 Impact - While wearing the suit without any auxiliary means of buoyancy, each subject jumps into water feet first six times from a height of 5 m above the water surface. Each subject must be able to assume a face-up stable position without assistance after each jump. The suit must not tear, separate at any seam, or sustain any damage that would render it unsafe to use.

8.1.4 Thermal Protection - The thermal protection capability of a suit must be tested under the following conditions and procedures:

8.1.4.1 Test Subjects - At least four male subjects must be used for this test. Each subject shall be familiarized with the test procedure prior to the start of the test. Each subject must be between 1.65 m and 1.85 m tall and must be not more than 10 % overweight or underweight for his height and physical type as determined by a physician or physiologist or from published physiological data. Each subject shall have had a normal night's sleep the night before the test, a well-balanced meal 1 to 5 h before the test, and no alcoholic beverages for 24 h prior to the test. In addition to the suit, each subject shall wear a tee shirt and shorts, a long sleeved cotton shirt, denim trousers, athletic socks, and oxford type shoes if the suit is intended for shoes to be worn inside.

8.1.4.2 Test Equipment - The test shall be conducted in calm circulating water with a temperature between $0^{\circ}C$ and $2^{\circ}C$. The air temperature 300 mm above the water surface shall be between minus $10^{\circ}C$ and $20^{\circ}C$. Each subject shall be instrumented with an electrocardiograph, a thermistor or thermocouple in the rectum placed 150 mm beyond the anus, a thermistor or the thermocouple on the tip of the index finger, and a thermistor or thermocouple on the tip of the great toe. Each thermistor or theromocouple shall have an accuracy of $0.1^{\circ}C$.

8.1.4.3 Test Procedure - A physician shall be present during this test. Before donning the suit, each subject rests quietly in a room with a temperature between 10°C and 25°C for 15 min. The rectal temperature is them recorded as the initial rectal temperature. The subject dons the suit as rapidly as possible without damaging the instrumentation, and immediately enters the water. The subject assumes a face-up, stable floating position. No auxiliary means of buoyancy may be used during this test. The subject remains in the water engaging in activity that maintains the heart rate between 50 and 140 per minute for the first hour, and 50 to 120 per minute thereafter, except that no attempt is made to control heart rate if the subject is shivering. Each temperature is recorded at least every 10 min. The test continues for 6 h from the time the subject first enters the water, unless it is terminated sooner.

8.1.4.4 Termination of Test - If any of the following occurs, the test of the subject must be terminated:

a. The physician determines that the subject should not continue.

b. The subject requests termination due to discomfort or illness.

c. The subject's rectal temperature drops more than 2°C below the initial rectal temperature, unless the physician determines that the subject may continue without danger.

d. The subject's finger or toe temperature drops below 5°C, unless the physician determines that the subject may continue without danger.

8.1.4.5 Test Completion - The average rectal temperature drop, the average finger temperature at the end of the test and the average toe temperature at the end of the test are determined using the data from all subjects, except where the tests were terminated for a reason stated in par. 8.1.4.4 a. or b. Data from at least four subjects shall be used in making the temperature calculations. When the tests are terminated due to a reason stated in par. 8.1.4.4 c. or d. the rates of temperature drop are calculated from the time each temperature started to drop to the time the test was terminated. The rates of temperature drop are extrapolated to 6 h for estimation of the final temperatures. The average drop in rectal temperature shall not be more than 2°C, and the average toe temperature and the average finger temperature shall not be less than 5°C.

8.1.5 Insulation - The suit material shall be tested under the following conditions and procedures except that if the suit material meets the requirements for the control sample in par. 8.1.5.1 (c), the Test Procedure in par. 8.1.5.2 is not required:

8.1.5.1 Test Equipment - The following equipment is required for the test:

a. A sealed copper or aluminum can that has at least two parallel flat surfaces and that contains at least 2 L of water and no air. One possible configuration of the can is shown in Figure 1.

b. A thermistor or the thermocouple with an accurancy of ±0.1°C arranged to measure the temperature of the water inside the can.

c. A control sample of two flat pieces of 4.75 mm thick, closed-cell neoprene foam of sufficient size to enclose the can between them. The control sample shall have a thermal conductivity of not more than 0.050 W/m.^{o}K. The thermal conductivity of the control sample shall be determined in accordance with the procedures of ASTM C 177 or C 518.

d. Two flat pieces of the suit materials of sufficient size to enclose the can between them. The surface covering, surface treatment, and number of layers of the material tested shall be the same as those of the material used in the suit. If the material used in the suit varies in thickness or number of layers, the material tested shall be representative of the portion of the suit having the least thickness of number of layers.

e. A clamping arrangement to form a watertight seal around the edges of the pieces of material when the can is enclosed inside. A sealing compound may be used. Figure 2 shows one possible configuration of the clamping arrangements.

f. A tank of water deep enough to hold the entire assembly of the can, material, and clamp at least 1 m below the surface of the water.

g. A means to control the termperature of the water between 0^{o}C and 1^{o}C.

h. A thermistor or thermocouple with an accuracy of $\pm$ 0.1^{o}C arranged to measure the temperature of the water at the depth at which the can, material, and clamp are held.

8.1.5.2 Test Procedure - Temperature of the water in the container shall be between $0^{\circ}C$ and $1^{\circ}C$. The can is held under water and clamped between the two pieces of the neoprene foam control sample, so that the assembly formed conforms as closely as possible to the shape of the can, and water fills all void spaces in the assembly. The entire assembly with the water temperature in the can at or above $45^{\circ}C$ is submerged in the tank of water to a depth of 1 m at the highest point of the assembly. No part of the assembly may touch the bottom or sides of the tank. Every 2 min the assembly is shaken and then inverted from its previous position. The time for the water inside the can to drop from $45^{\circ}C$ to $33^{\circ}C$ is recorded. This procedure shall be performed three times. This procedure shall be repeated three more times using the suit material instead of the neoprene control sample. The shortest time for the drop in water temperature when the suit material is used shall be greater than or equal to the shortest time when the neoprene control sample is used.

8.1.6 Storage Temperature - The suit in its storage case is placed in a chamber with a temperature of $60 \pm 3^{\circ}C$ for 24 h. A test subject then enters the chamber and dons the suit. This procedure is repeated at a temperature of minus $30 \pm 3^{\circ}C$. The subject may wear protective clothing for this test. Under each condition, the subject must be able to don the suit without damaging it.

8.1.7 Buoyancy - The original measured buoyancy, the buoyancy after 24 h immersion, the buoyancy retention and the corrected buoyancy of the suit shall be measured under the following conditions and procedures:

8.1.7.1 Test Equipment - The following equipment is required for this test:

a. A mesh basket that is large enough to hold a folded survival suit and that is weighted sufficiently to overcome the buoyancy of the suit when placed in the basket.

b. A tank of fresh water that is large enough to contain the basket submerged with its top edge 50 mm below the surface of the water.

c. A scale or load cell that has an accuracy of 0.15 N and that is arranged to support and determine the mass of the basket in the tank.

8.1.7.2 Determination of Original Measured Buoyancy - The basket is submerged so that its top edge is 50 mm below the surface of the water. The mass of the submerged basket is determined. Thereafter the suit under test is submerged in the water, filled with water, folded and then placed in the submerged basket. The basket is tilted 45° from the vertical for 5 min. in each of four different directions to allow all entrapped air to escape. The basket with the suit is then suspended in the water with the top edge of the basket 50 mm below the surface of the water. The mass of the submerged basket and suit are determined immediately. The original measured buoyancy of the suit is then determined by subtracting the mass of the basket plus suit from the mass of the basket and calculating the buoyancy in newtons.

8.1.7.3 Determination of Buoyancy After 24 h Immersion - The adult or child size suit under test shall be submerged in the fresh water tank for 24 h and the buoyancy shall then be determined as described in par. 8.1.7.2 and expressed in newtons.

8.1.7.4 Buoyancy Retention - Buoyancy retention is the buoyancy of the suit after 24 h immersion (par. 8.1.7.3) expressed as a percent of the original measured buoyancy (par. 8.1.7.2).

8.1.7.5 Corrected Buoyancy - The corrected buoyancy of the suit is its measured buoyancy reduced by the buoyant correction factor of the buoyant suit material. The correction is made for barometric pressure and water temperature and is determined in accordance with UL 1191 except the minimum number of samples required to determine each property is to be 10 instead of 75.

8.1.7.6 Determination of Corrected Buoyancy After 24 h Immersion - The buoyancy of the suit after 24 h immersion is determined as described in par. 8.1.7.3 and this buoyancy value is corrected as described in par. 8.1.7.5.

8.1.8 Flame Exposure - The immersion suit and the storage case shall be tested for resistance to flame under the following conditions and procedures:

8.1.8.1 Test Equipment - The following equipment is required for this test:

a. A metal pan at least 300 mm wide, 450 mm long, and 60 mm deep. The pan shall have at least 12 mm of water on the bottom with approximately 40 mm of gasoline floating on top of the water.

b. An arrangement to hold the suit and the storage case over the gasoline.

8.1.8.2 Immersion Suit Flame Exposure Test Procedure - The suit is held from the top by the holding arrangement. The gasoline is ignited and allowed to burn for approximately 30 s in a draft-free location. The suit is then held with the lowest part of each foot 240 mm above the surface of the burning gasoline. After 2 s, measured from the moment the flame first contacts the suit, the suit is removed from the fire. If the suit is burning, it is allowed to continue to burn for 6 s before the flames are extinguished. If suit sustains any visible damage other than scorching, it shall be subjected to the Stability Test (par. 8.1.3.8) using one subject, the Impact Test (par. 8.1.3.12

using one subject, the Thermal Protection Test (par. 8.1.4) and the Buoyancy Test (par. 8.1.7) except the immersion time shall be for 2 h instead of 24 h.

8.1.8.3 Storage Case Flame Exposure Test Procedure - The storage case is tested using the same equipment (par. 8.1.8.1) required for the immersion suit flame exposure test. The immersion suit shall be placed inside the storage case for the test. The storage case is held from its top by the holding arrangement. The gasoline is ignited and allowed to burn for approximately 30 s in a draft-free location. The storage case is then held with its lowest point 240 mm above the surface of the burning gasoline. After 2 s measured from the moment the flames first contact the case, the case is removed from the fire. If the case is burning it is allowed to continue to burn for 6 s before the flames are extinguished. The storage case material must not burn through at any point in this test and the immersion suit must not sustain any visible damage.

8.1.9 Corrosion Resistance - Each metal part of the suit that is not 410 stainless steel, or for which published evidence of salt-spray corrosion resistance equal to or greater than 410 stainless steel is not available, shall be tested as described in ASTM B 117. A sample of each metal under test and a sample of 410 stainless steel shall be tested for 720 h . At the conclusion of the test, each sample of test metal shall show corrosion resistance equal to or better than the sample of 410 stainless steel.

8.1.10 Body Strength - The body strength of the suit shall be tested under the following conditions and procedures:

8.1.10.1 Test Equipment - The test apparatus shown in Figure 3 shall be used in this test. This apparatus consist of -

a. Two rigid cylinders each 125 mm in diameter, with an eye or ring at each end.

b. A weight of 135 kg; and

c. Ropes or cables of sufficient length to allow the suit to be suspended as shown in Figure 3.

8.1.10.2 Test Procedure - The suit is cut at the waist and wrists, or holes are cut into it as necessary to accommodate the test apparatus. The suit is immersed in water for at least 2 min . The suit is then removed from the water and immediately arranged on the test apparatus, using each closure as it would be used by a person wearing the suit. The 135 kg load is applied for 5 min. No part of the suit may tear or break during this test. The suit shall not be damaged in any way that would allow water to enter, or that would affect the performance of the suit.

8.1.11 Seam Strength - The strength of each different type of seam used in the suit shall be tested under the following conditions and procedures.

8.1.11.1 Test Equipment - The following equipment shall be used in this test:

a. A chamber in which air temperature can be controlled to $23 \pm 2^{\circ}C$ and relative humidity can be controlled to $50 \pm 5\%$.

a. A device to apply tension to the seam by means of a pair of top jaws and a pair of bottom jaws. Each set of jaws shall grip the material on both sides so that it does not slip when the load is applied. Each jaw shall be 25 mm wide by 25 mm long. The distance between the jaws before the load is applied shall be 75 mm.

8.1.11.2 Test Samples - Each test sample shall consist of two pieces of suit material each of which is 100 mm^2. The two pieces are joined by a seam as shown in Figure 4. For each type of seam 5 samples are required. Each sample may be cut from the suit, or may be prepared specifically for this test. One type of seam is distinguished from another by the type and size of stitch or other joining method used, and by the type and thickness of the materials joined at the seam.

8.1.11.3 Test Procedure - Each sample is conditioned for at least 40 h at 23 $\pm$ 2°C and 50 $\pm$ 5% relative humidity. Immediately after conditioning, each sample is mounted individually in the tension device as shown in Figure 4. The jaws are separted at a rate of 5 mm/s . The force (N) at rupture shall be recorded. The average force at rupture shall be determined.

8.1.11.4 Tear Resistance - The tear resistance of the suit material shall be determined by the method described in ASTM D 1004. If more than one material is used, each material must be tested. If varying thicknesses of a material are used in the suit samples representing the thinnest portion of the material must be tested. If multiple layers of material are used in the suit, samples representing the layer on the exterior of the suit must be tested. Any material which is a composite formed of two or more materials bonded together is considered to be a single material.

8.1.11.5 Abrasion Resistance - The abrasion resistance of each type of suit material on the exterior of the suit shall be determined by the method described in Federal Test Methods Standard 191, Method 5304.1. If varying thicknesses of exterior suit material are used, samples representing the thinnest portion of the material must be tested. If exterior material has multiple layers, samples of the layer on the outside surface of the suit must be tested. Any exterior material which is a composite formed of two or more materials bonded together is considered to be a single material and the abradant must be applied to the surface that is on the exterior of the suit. The residual breaking strength of each material shall be determined.

8.2 Approval Testing For Child Size Immersion Suit - Child Size Survival Suits shall pass the following tests:

a. The Stability Test described in par. 8.1.3.8 except that six children of either sex shall be used as test subjects. The subjects shall be within the size prescribed in par. 3.1.2 and have a mass range of at least 10 kg.

b. The Buoyancy Test described in par. 8.1.7.

c. The Body Strength test described in par. 8.1.10 except that the cylinders shall be 50 mm diameter and the test mass shall be 55 kg.

8.3 Test Report - After the approval tests are completed, a test report shall be prepared by the independent laboratory.

8.3.1 The test report shall contain:

The name and address of the applicant;

The name and address of the independent laboratory;

A detailed description of the test procedure and apparatus used;

Detailed test results including all data recorded and a description of each test failure and each other discrepancy;

The date and location of testing;

The name of each test particpant and observer;

Photographs showing at least one overall view of the suit, enough views to show all major design details, test apparatus, and each failure occurring during testing.

9. MARKING

a. Each suit shall be marked with the name of the manufacturer, the date of manufacture, the model, the size, and lot number and the Canadian Coast Guard approval number.

b. Each storage case shall be marked with the words "immersion suit" and the size.

c. The size markings for the child size immersion suits required under par. 9 (a) and 9(b) shall also include the following statements in print, smaller than the print for the word "CHILD": ("SMALL ADULT UNDER 50 kg").

10. PRODUCTION INSPECTION

10.1 One out of every 100 immersion suits produced shall be tested for buoyancy as described in par. 8.1.7 and shall be given a complete visual examination. The suit shall be selected at random from a production lot of 100 suits and tested by, or under the supervision of, a Canadian Coast Guard marine surveyor or by an independent laboratory.

10.2 If the suit fails to pass this test under par. 10.1 or if the visual examination shows that the suit does not meet each construction and performance requirement in par. 5.1 and 5.2, 10 additional suits from the same lot shall be selected at random and tested as prescribed in par. 10.1 or examined for the defect.

10.3 If one or more of the 10 suits fails to pass the test or examination, each suit in the lot shall be tested or examined for the defect for which the lot was rejected. Only suits that pass the test or that are free of the defect may be sold as Canadian Coast Guard approved.

10.4 The manufacturer shall ensure that the production inspections described in the manufacturer's quality control procedure described in par. 7.3.1.1 are performed to the satisfaction of the approval authority.

10.5 The manufacturer must report the results of each production inspection performed under par. 10.2 and par. 10.3 to the Director, Ships Safety Branch, Canadian Coast Guard. The report must be prepared by a Canadian Coast Guard Marine surveyor or by an independent laboratory.

10.6 The manufacturer shall keep records showing:

(a) Source and type of materials and components and invoice numbers.

(b) Acceptance of conformity of materials and components to applicable standards.

(c) Quantity of supplies received.

(d) Quantity of supplies used by lot number.

(e) Balance of supplies on hand.

(f) All records shall be available on demand to a Canadian Coast Guard Marine Surveyor or to an independent laboratory.

10.7 A Canadian Coast Guard Marine Surveyor or an independent laboratory shall be satisfied, by examination of invoices and comparison with the approval device, that the materials and design are in accordance with the provisions of this standard.

10.8 Repairs and Alterations - The approval of a repaired, recovered or altered immersion suit shall only remain in effect when the repairs, recovering or alterations are done solely by a manufacturer of Approved Immersion Suits or an agency authorized by such a manufacturer and it has been inspected as applicable in accordance with the procedures as described in Sec. 10 and found to be acceptable.

11. NOTES

11.1 Options - The following option provided in this standard should be specified in application of this standard:

a. Size of immersion suit (adult or child size) par. 3.

11.2 Related Specifications - This standard is based essentially on U.S. Department of Transportation, Coast Guard Standard Part 160 and Part 161 of the Federal Register and on UL 1197 Standard For Exposure Suits.

11.3 The publications listed in par. 2.1.1 are obtainable from the Canadian Government Publishing Centre, Supply and Services Canada, Ottawa, Ontario, K1A 0S9. Telephone (819) 997-2560

11.4 The publication listed in par. 2.1.2 is obtainable from Underwriters Laboratories Inc., Publications Stock, 333 Pfingston Road, Northbrook, IL. 66062 U

11.5 The publications listed in par. 2.1.3 are available from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103, U.S.A.

11.6 The publication listed in par. 2.1.4 is available from the Business Service Center, General Services Administration, Washington, D.C. 20407 or from any regional General Services Administration Business Service Center.

11.7 The publications listed in par. 2.1.5 are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, U.S.A.

INSULATION TEST ASSEMBLY

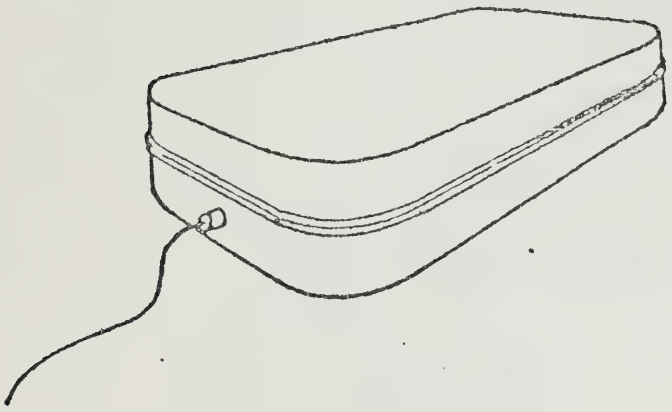


Figure 1 Water can for Insulation test shown with thermistor lead.

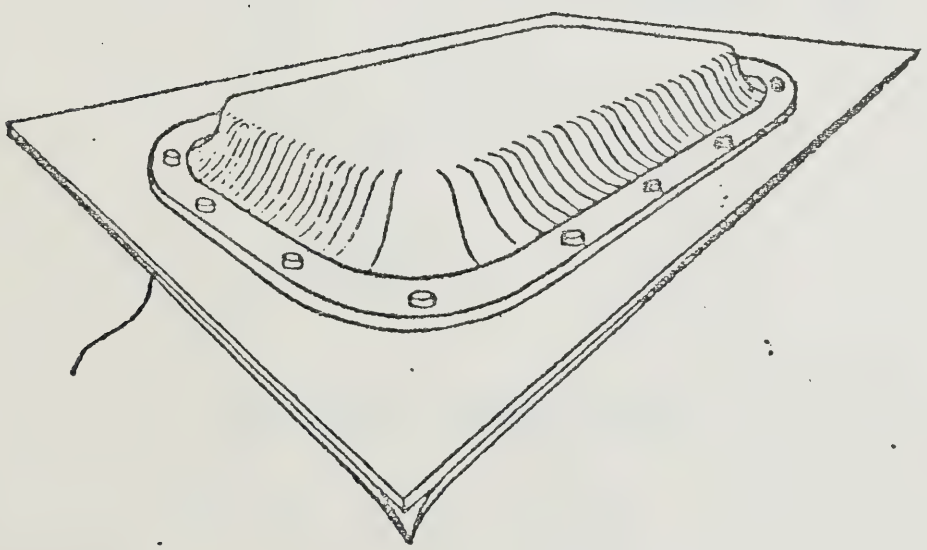


Figure 2 Assembly formed with water can, two pieces of material, and clamping device, with thermistor lead brought out of the assembly between the pieces of material.

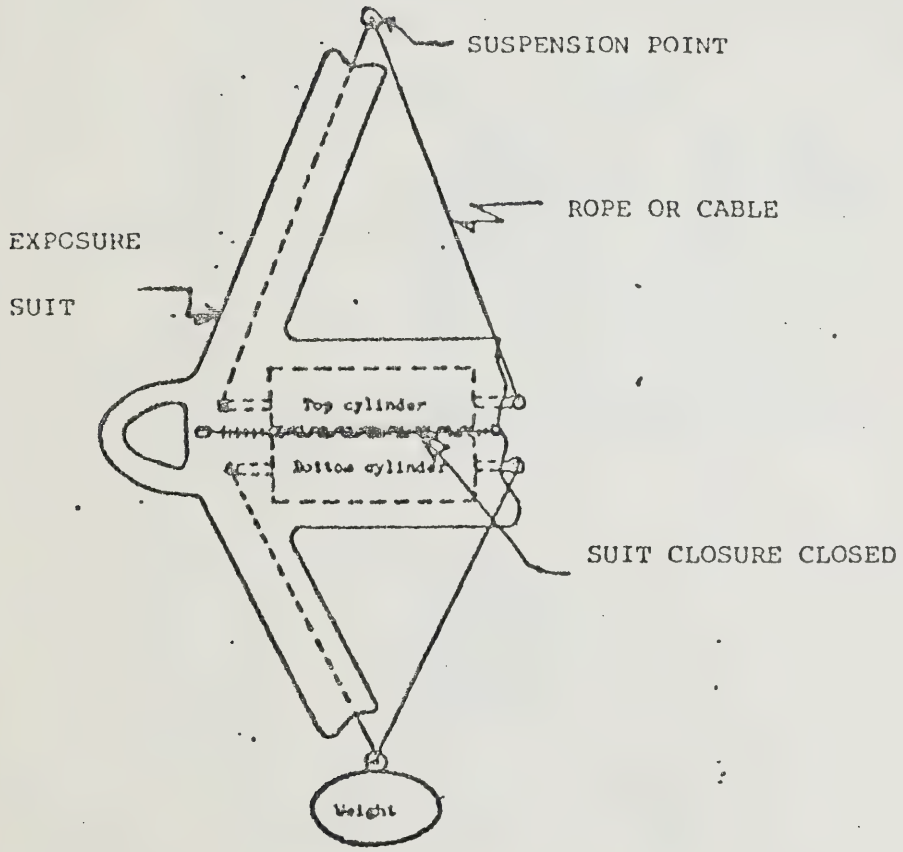


Figure 3 Body strength test apparatus.

METHOD FOR MOUNTING SAMPLE FOR SEAM STRENGTH TEST

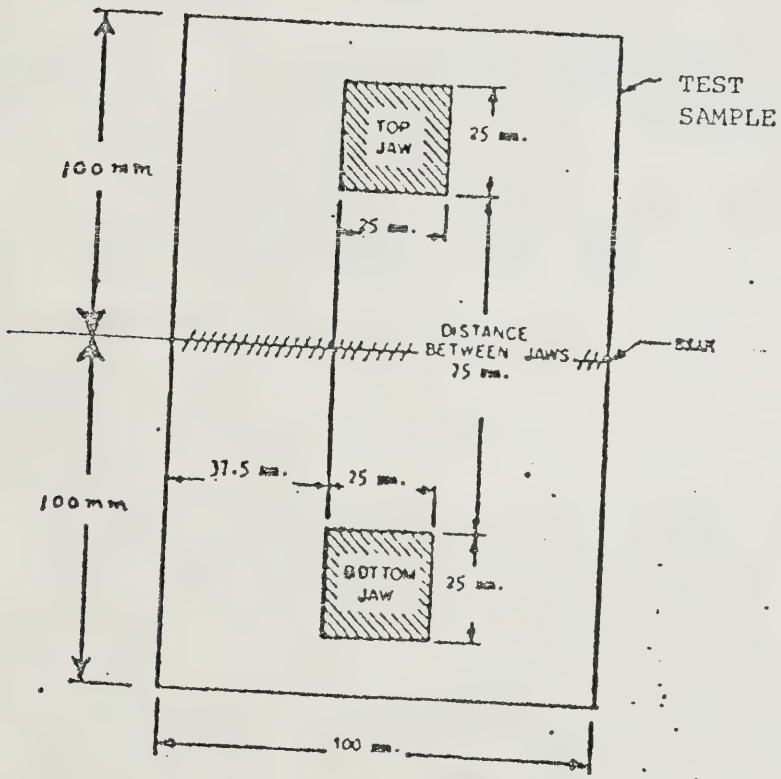


Figure 4

Personal Buoyant Safety Device Light (PBSDL)

1. SCOPE

1.1 This appendix prescribes construction and performance requirements, approval and production tests and procedures for approving personal buoyant safety device lights fitted on Canadian Coast Guard approved immersion suits. and on immersion suits already in service (65-GP-16M, par. 7.1.1).

2. TERMINOLOGY

2.1 Storage Life - For the purpose of this standard "storage life" means the amount of time after the date of manufacture of the power source of a light that the power source can be stored under typical marine environmental conditions on a vessel and still have sufficient power for the light to meet the performance requirements, par. 3.2.

3. DETAIL REQUIREMENTS

3.1 Construction

a. Each light must be designed to be attached to an immersion suit without damaging the suit or interfering with its performance.

b. Each light and its power source must be designed to be removed and replaced without causing damage to the immersion suit.

c. The storage life of the power source of a light must be twice as long as the period between the date of manufacture and the expiration date of the power source.

d. Each light, prior to activation, must be capable of preventing leakage from its container of any chemicals it contains or produces.

e. Each component of a light must be designed to remain serviceable in a marine environment for at least as long as the storage life of the light's power source.

f. No light may have a water pressure switch.

g. Each light must be designed so that when attached to an immersion suit its light beam, at a minimum, is visible in an arc of 180° above or in front of the wearer.

h. Each light, including its power source, must fit into a cylindrical space that is 150 mm long and 75 mm in diameter.

i. Each light, including its power source, must not have a mass more than 225 g.

j. Each light that is designed to operate while detached from the immersion suit must have a lanyard that can be used to connect it to the suit. The lanyard must be at least 750 mm long.

k. Each light designed to operate while detached from an immersion suit must be capable of floating in water with its light source at or above the surface of the water.

3.2 PERFORMANCE

a. If a light is a flashing light, its flash rate when first activiated, or within 5 min thereafter, must be between 50 and 70 flashes per min.

b. Each light must -- 1. begin to shine within 2 min after activation; and 2. within 5 min after activation be capable of being seen from a distance of at least 1852 m* on a dark clear night.

c. Each light must be designed to operate under water continuously for at least 8 h at a water temperature of 15 ± 5°C. However, if the light needs air to operate, underwater operation is required only for 50 or more seconds during each minute of the 8 h period.

* 1852 m = 1 nautical mile

d. Each light must be designed to operate both in sea water and in fresh water.

e. A light that concentrates its light beam by means of a lens or curved reflector must not be a flashing light.

f. Each light must be designed to operate in accordance with this section after storage for 24 h at a temperature of 65 $\pm$ 2°C and after storage for 24 h at -30 $\pm$ 2°C.

4. INSTRUCTIONS FOR USE

a. Each light must have instructions in both official languages (English and French) on how to attach it to an immersion suit in a manner that complies with par. 3.1 a. However, in the case of lights that are to be attached by an immersion suit manufacturer, only one set of instructions need be provided for each shipment of lights.

b. If a light is designed to be attached to a finished immersion suit any attachment materials that are not supplied with the light must be clearly identified in the instructions. If a light is to be attached to a finished immersion suit by purchaser, any attachment materials not supplied with the light must be generally available for purchase.

c. Each set of instructions must -- 1. clearly identify the kind of immersion suit construction (for example fabric covered or vinyl dipped) to which the light can be attached; and 2. not require penetration of the buoyant material of the immersion suit.

APPROVAL PROCEDURE

a. An application for approval of a personal buoyant safety device light must be sent to:

Director
Ship Safety Branch
Canadian Coast Guard
Department of Transport
Place de Ville
Ottawa, Ontario
K1A 0N7

b. Each application for approval must contain --

1. the name and address of the applicant;

2. two copies of plans showing the construction details of the light;

3. a detailed description of the applicant's production testing program;

4. an independent laboratory test report containing the observations and results of approval testing.

c. The Director, Ship Safety Branch advises the applicant whether the light is approved. If the light is approved, an approval certificate is sent to the applicant.

APPROVAL TESTING

a. The approval tests described in this section must be conducted for each light submitted for Canadian Coast Guard approval. The tests must be conducted by a laboratory that has the equipment, personnel, and procedures necessary to conduct the approval tests required by this subpart, and that is free of influence and control of the applicant and other manfactures, suppliers, and vendors of lights for immersion suits.

b. A sample light must be activated at night under clear atmospheric conditions. However, two lights must be used if the power source is water activated, and one light must be activated in fresh water and the other in salt water having the approximate salinity of sea water. The light, or lights must begin to shine within 2 min after activation and, within 5 min after activation, must be seen from a distance of at least 1852 m* against a dark background.

c. At least 10 sample lights must be selected at random from a group of at least 25. Each sample light must be kept at a constant temperature of 65 $\pm$ 2°C for 24 h. Each sample light must then be kept at a constant temperature of minus 30 $\pm$ 2°C for 24 h. Five samples must then be submerged in salt water having the approximate salinity of sea water and the five other samples must be submerged in fresh water. The temperature of the water must be 15 $\pm$ 5°C. The lights must then be activated and left submerged for 8 h. However, if their power sources need a supply of air to operate, the lights may be brought to their normal operating positions at the surface of the water for up to 10 s/min during the 8 h period. At least 9 of the 10 lights must operate continuously over the 8 h period. If the lights are flashing lights, at least 9 of 10 must have a flash rate of between 50 and 70 flashes per minute when first activated or within 5 min thereafter.

* 1852 m = 1 nautical mile

d. Individual tests must be conducted on a sample light to determine whether the light meets the requirements of par. 3.1, except that technical data showing compliance with par. 3.1 c may be submitted with the application for approval in lieu of performing an individual test.

7. MARKING

a. Each light manufactured under Canadian Coast Guard approval must be permanently and legibly marked in English and French with:

The manufacturer's name or trade mark that clearly identifies the model designation and his lot number,

The Canadian Coast Guard approval number assigned to the light; and

Instructions on how to activate the light.

b. The power source of each light must be permanently and legibly marked with its date of manufacture and expiration date. Each date must include the month and year.

8. PRODUCTION INSPECTION AND TESTING

a. The manufacturer of approved lights must randomly select a sample of ten lights from each lot of lights produced. Each lot must not exceed 1 000 lights. At least 9 of the 10 lights, when tested in accordance with the test described in par. 6 (c) must meet the test criteria prescribed by that section. If less than 9 lights meet the test criteria, another random sample of 10 lights must be taken and tested. If less than 9 of these lights meet the test criteria, none of these lights in the lot may be sold as Canadian Coast Guard approved equipment. The results of these tests are to be sent to the Director, Ship Safety Branch see par. 5 b of this Appendix.

b. The Canadian Coast Guard does not inspect lights approved under this subpart on a regular schedule. However, the Director, Ship Safety Branch may select samples and conduct tests and examinations whenever necessary to determine whether the lights are being manufactured in compliance with the requirements in this subpart.

ANNEX C

TABLE C-1

POTENTIAL SAR CLIENTS

CANADIAN DOMICILED CARRIERS (1981)

	CREW	PASSENGERS	TOTAL
Region of Service:			
Atlantic	6,990	4,505,780	4,512,770
Pacific	5,113	20,566,552	20,571,665
Inland Waters	3,649	5,730,640	5,734,289
Arctic & Mackenzie River	401	30	431
International	2,533	258,909	261,442
No Assigned Areas	633	-	633
	19,319	31,061,911	31,081,230

No. of vessels owned and operated - 1955
Source: Statistics Canada, Water Transportation 1981
Cat. 54-205

TABLE C-2

POTENTIAL SAR CLIENTS

ARRIVALS AND DEPARTURES OF COASTWISE SHIPPING VESSELS BY PROVINCE (1981)

	ARRIVALS	DEPARTURES	TOTAL MOVEMENTS
Newfoundland	8,648	8,263	16,911
Prince Edward Island	179	179	358
Nova Scotia	1,476	1,744	3,220
New Brunswick	511	505	1,016
Quebec	5,061	4,936	9,997
Ontario	2,996	3,057	6,053
Manitoba	23	24	47
British Columbia	10,181	9,447	19,628
North West Territories	73	73	146
TOTAL	29,148	28,228	57,376

Source: Statistics Canada, Coastwise Shipping Statistics 1982
Cat 54-210

TABLE C-3

POTENTIAL SAR CLIENTS

COASTWISE SHIPPING DEPARTURES BY VESSELS OF FOREIGN REGISTRY (1982)

Atlantic & Lower St. Lawrence River Ports	383
Great Lakes Ports	3
Pacific Ports	2
National	388

Source: Statistics Canada, Coastwise Shipping Statistics, 1982
Cat. 54-210

POTENTIAL SAR CLIENTS

COASTWISE SHIPPING ARRIVALS BY VESSELS OF FOREIGN REGISTRY

Atlantic & Lower St. Lawrence River	488
Great Lakes	7
Pacific	1
National	496

Source: Statistics Canada, Coastwise Shipping Statistics, 1982
Cat. 54-210

TABLE C-4

POTENTIAL SAR CLIENTS

VESSEL DEPARTURES AND ARRIVALS BETWEEN CANADIAN & FOREIGN PORTS

REGION	CDN. VESSELS ARR.	DEP.	TOTAL	US VESSELS ARR.	DEP.	TOT.	ALL VESSELS ARR.	DEP.	TOT.
Atlantic	721	600	1,321	31	46	77	4,143	4,147	8,290
St. Lawrence	607	778	1,385	173	175	348	4,808	4,979	9,787
Great Lakes	4,534	4,481	9,015	1,804	1,770	3,574	6,946	6,860	13,806
Pacific	3,577	3,616	7,193	1,791	1,643	3,434	9,424	9,292	18,716
TOTAL	9,439	9,475	18,914	3,799	3,634	7,433	25,321	25,278	50,599

Source: Statistics Canada, International Seaborne Shipping Commodity Statistics 1981 Cat. 54-209

TABLE C-5

POTENTIAL SAR CLIENTS

NUMBER OF REGISTERED FISHERMEN BY PROVINCE (1981)

	FRESHWATER	SEA	TOTAL
Newfoundland	-	28,587	28,587
Nova Scotia	-	11,388	11,388
Prince Edward Island	-	2,749	2,749
New Brunswick	127	5,802	5,929
Quebec	517	4,724	5,241
Ontario	2,043	-	2,043
Prairie Prov. & NWT	5,369	-	5,369
British Columbia	-	17,454	17,454
TOTAL	8,056	70,704	78,760

Source: Canadian Fisheries - Annual Statistical Review (1981)

TABLE C-6

POTENTIAL SAR CLIENTS

NUMBER OF REGISTERED FISHING VESSELS BY PROVINCE (1981)

	FRESHWATER	SEA	TOTAL
Newfoundland		17,135	17,135
Nova Scotia		6,689	6,689
Prince Edward Island		1,534	1,534
New Brunswick	41	3,102	3,143
Quebec	412	2,485	2,897
Ontario	1,122	-	1,122
Prairie Prov. & NWT	1,976	-	1,976
British Columbia	-	7,261	7,261
TOTAL	3,551	38,206	41,757

Source: Canadian Fisheries - Annual Statistical Review (1981)

TABLE C-7

POTENTIAL SAR CLIENTS

FISHING VESSELS UNDER 25 TONS BY PROVINCE

	NUMBER	% OF TOTAL VESSELS IN PROVINCE
Newfoundland	16,665	97.3%
Nova Scotia	6,097	91.0%
Prince Edward Island	1,525	99.4%
New Brunswick	2,893	93.3%
Quebec	2,331	93.8%
British Columbia	5,893*	78.0%
TOTAL		

*Under 40 ft. in length - no information available on tonnages
1980 statistic -

Source: Canadian Fisheries, Annual Statistical Review 1981

TABLE C-8

POTENTIAL SAR CLIENTS

SEA FISHERIES: NUMBER AND VALUE OF REGISTERED FISHING VESSELS, BRITISH COLUMBIA, 1980 - 1981

PECHES MARITIMES: NOMBRE ET VALEUR DES BATEAUX DE PECHE ENREGISTRES, COLOMBIE-BRITANNIQUE, 1980 - 1981

Value (V) in thousand dollars - Valeur (V) en milliers de dollars

OVERALL LENGTH - LONGUEUR HORS-TOUT	1980		1981	
	No.	V	No.	V
Under 20 feet - Moins de 20 pieds	360	4 549	---	---
20 to 29.9 feet - 20 à 29.9 pieds	1 793	36 039	---	---
30 to 34.9 feet - 30 à 34.9 pieds	1 937	140 445	---	---
35 to 39.9 feet - 35 à 39.9 pieds	1 803	200 909	---	---
40 to 49.9 feet - 40 à 49.9 pieds	873	187 979	---	---
50 to 59.9 feet - 50 à 59.9 pieds	366	129 338	---	---
60 to 69.9 feet - 60 à 69.9 pieds	194	91 440	---	---
70 to 74.9 feet - 70 à 74.9 pieds	65	35 292	---	---
75 to 79.9 feet - 75 à 79.9 pieds	47	33 963	---	---
80 to 99.9 feet - 80 à 99.9 pieds	58	29 541	---	---
100 to 119.9 feet - 100 à 119.9 pieds	28	13 358	---	---
120 to 139.9 feet - 120 à 139.9 pieds	16	7 241	---	---
140 to 159.9 feet - 140 à 159.9 pieds	2	3 930	---	---
160 feet and over - 160 pieds et plus	9	7 901	---	---
TOTAL	7 551	921 925	7 261	---

Source: Canadian Fisheries; Annual Statistical Review 1981

TABLE C-9

POTENTIAL SAR CLIENTS

SEA FISHERIES: NUMBER AND VALUE OF REGISTERED FISHING VESSELS, QUEBEC, 1980 - 1981

PÊCHES MARITIMES: NOMBRE ET VALEUR DES BATEAUX DE PÊCHE ENREGISTRÉS, QUÉBEC, 1980 - 1981

Value (V) in thousand dollars - Valeur (V) en milliers de dollars

TONNAGE AND LENGTH - JAUGE ET LONGUEUR	1980		1981	
	No.	V	No.	V
BY GROSS TONNAGE - PAR JAUGE BRUTE				
Under 10 tons - Moins de 10 tonneaux	2 063	9 110	2 023	9 931
10 to 25 tons - 10 à 25 tonneaux	302	9 716	308	10 381
26 to 49 tons - 26 à 49 tonneaux	84	9 715	89	11 255
50 to 99 tons - 50 à 99 tonneaux	34	6 632	42	9 495
100 to 149 tons - 100 à 149 tonneaux	15	5 247	15	5 580
150 tons and over - 150 tonneaux et plus	6	10 250	8	10 963
TOTAL	2 504	50 670	2 485	57 605
BY OVERALL LENGTH - PAR LONGUEUR HORS-TOUT				
Under 20 feet - Moins de 20 pieds	881	1 405	897	1 884
20 to 24.9 feet - 20 à 24.9 pieds	415	1 076	401	1 062
25 to 29.9 feet - 25 à 29.9 pieds	413	1 426	364	1 332
30 to 34.9 feet - 30 à 34.9 pieds	289	2 896	293	3 387
35 to 39.9 feet - 35 à 39.9 pieds	169	4 799	183	5 282
40 to 44.9 feet - 40 à 44.9 pieds	126	4 228	133	4 549
45 to 64.9 feet - 45 à 64.9 pieds	186	18 282	181	19 951
65 to 89.9 feet - 65 à 89.9 pieds	19	6 300	27	9 908
90 to 99.9 feet - 90 à 99.9 pieds	1	250	1	250
100 to 124.9 feet - 100 à 124.9 pieds	--	--	--	--
125 to 149.9 feet - 125 à 149.9 pieds	5	10 008	5	10 000
150 feet and over - 150 pieds et plus	--	--	--	--
TOTAL	2 504	50 670	2 485	57 605

Source: Canadian Fisheries; Annual Statistical Review 1981

TABLE C-10

POTENTIAL SAR CLIENTS

SEA FISHERIES: NUMBER AND VALUE OF REGISTERED FISHING VESSELS, NEW BRUNSWICK, 1980 - 1981

PÊCHES MARITIMES: NOMBRE ET VALEUR DES BATEAUX DE PÊCHE ENREGISTRÉS, NOUVEAU-BRUNSWICK, 1980 - 1981

Value (V) in thousand dollars - Valeur (V) en milliers de dollars

TONNAGE AND LENGTH - GAUGE ET LONGUEUR	1980		1981	
	No.	V	No.	V
BY GROSS TONNAGE - PAR GAUGE BRUTE				
Under 10 tons - Moins de 10 tonneaux	1 638	6 337	1 596	6 351
10 to 25 tons - 10 à 25 tonneaux	1 331	20 627	1 297	24 122
26 to 49 tons - 26 à 49 tonneaux	89	8 963	93	9 937
50 to 99 tons - 50 à 99 tonneaux	82	25 804	80	26 559
100 to 149 tons - 100 à 149 tonneaux	25	12 242	24	12 392
150 to 499 tons - 150 à 499 tonneaux	12	14 160	11	13 160
500 tons and over - 500 tonneaux et plus	1	xx[a]	1	xx[a]
TOTAL	3 178	88 133	3 102	92 521
BY OVERALL LENGTH - PAR LONGUEUR HORS-TOUT				
25 TONS OR LESS - 25 TONNEAUX OU MOINS				
Under 20 feet - Moins de 20 pieds	689	1 436	696	1 427
20 to 24.9 feet - 20 à 24.9 pieds	449	1 506	432	1 428
25 to 29.9 feet - 25 à 29.9 pieds	174	896	161	910
30 to 34.9 feet - 30 à 34.9 pieds	147	1 071	140	1 227
35 to 39.9 feet - 35 à 39.9 pieds	457	4 937	441	5 436
40 to 44.9 feet - 40 à 44.9 pieds	862	12 866	956	18 050
45 feet and over - 45 pieds et plus	191	4 252	67	1 994
TOTAL	2 969	26 964	2 893	30 472
OVER 25 TONS - PLUS DE 25 TONNEAUX				
Under 45 feet - Moins de 45 pieds	6	599	12	914
45 to 64.9 feet - 45 à 64.9 pieds	158	34 134	154	35 999
65 to 89.9 feet - 65 à 89.9 pieds	34	13 396	32	12 096
90 to 99.9 feet - 90 à 99.9 pieds	2	1 450	2	1 450
100 to 124.9 feet - 100 à 124.9 pieds	7	10 450	7	10 450
125 to 149.9 feet - 125 à 149.9 pieds	1	xx	1	xx
150 feet and over - 150 pieds et plus	1	xx	1	xx
TOTAL	209	61 169	209	62 049

(a) - Confidential, included with "150 to 499 tons".
- Confidentiel, y compris dans "150 à 499 tonneaux".

Source: Canadian Fisheries; Annual Statistical Review 1981

TABLE C-11

POTENTIAL SAR CLIENTS

SEA FISHERIES: NUMBER AND VALUE OF REGISTERED FISHING VESSELS, PRINCE EDWARD ISLAND, 1980 - 1981

PECHES MARITIMES: NOMBRE ET VALEUR DES BATEAUX DE PECHE ENREGISTRES, ILE-DU-PRINCE-EDOUARD, 1980 - 1981

Value (V) in thousand dollars - Valeur (V) en milliers de dollars

TONNAGE AND LENGTH - GAUGE ET LONGUEUR	1980		1981	
	No.	V	No.	V
BY GROSS TONNAGE - PAR GAUGE BRUTE				
Under 10 tons - Moins de 10 tonneaux	813	4 738	694	4 435
10 to 25 tons - 10 à 25 tonneaux	785	12 332	827	14 276
26 to 49 tons - 26 à 49 tonneaux	1	xx	2	xx
50 to 99 tons - 50 à 99 tonneaux	4	xx	2	xx
100 to 149 tons - 100 à 149 tonneaux	--	--	--	--
150 to 499 tons - 150 à 499 tonneaux	5	xx	5	xx
500 tons and over - 500 tonneaux et plus	--	--	--	--
TOTAL	1 608	20 357	1 534	21 936
BY OVERALL LENGTH - PAR LONGUEUR HORS-TOUT				
25 TONS OR LESS - 25 TONNEAUX OU MOINS				
Under 20 feet - Moins de 20 pieds	69	83	59	84
20 to 24.9 feet - 20 à 24.9 pieds	8	22	6	19
25 to 29.9 feet - 25 à 29.9 pieds	8	18	7	35
30 to 34.9 feet - 30 à 34.9 pieds	60	277	53	284
35 to 39.9 feet - 35 à 39.9 pieds	530	3 963	471	3 780
40 to 44.9 feet - 40 à 44.9 pieds	766	10 387	869	13 477
45 feet and over - 45 pieds et plus	157	2 320	60	1 033
TOTAL	1 598	17 070	1 525	18 712
OVER 25 TONS - PLUS DE 25 TONNEAUX				
Under 45 feet - Moins de 45 pieds	1	xx	1	xx
45 to 64.9 feet - 45 à 64.9 pieds	4	xx	3	xx
65 to 89.9 feet - 65 à 89.9 pieds	--	--	--	--
90 to 99.9 feet - 90 à 99.9 pieds	4	xx	4	xx
100 to 124.9 feet - 100 à 124.9 pieds	--	--	--	--
125 to 149.9 feet - 125 à 149.9 pieds	1	xx	1	xx
150 feet and over - 150 pieds et plus	--	--	--	--
TOTAL	10	3 287	9	3 224

Source: Canadian Fisheries; Annual Statistical Review 1981

TABLE C-12

POTENTIAL SAR CLIENTS

SEA FISHERIES: NUMBER AND VALUE OF REGISTERED FISHING VESSELS, NOVA SCOTIA, 1980 - 1981

PECHES MARITIMES: NOMBRE ET VALEUR DES BATEAUX DE PECHE ENREGISTRES, NOUVELLE-ECOSSE, 1980 - 1981

Value (V) in thousand dollars - Valeur (V) en milliers de dollars

TONNAGE AND LENGTH - GAUGE ET LONGUEUR	1980		1981	
	No.	V	No.	V
BY GROSS TONNAGE - PAR GAUGE BRUTE				
Under 10 tons - Moins de 10 tonneaux	4 872	20 803	4 254	20 836
10 to 25 tons - 10 à 25 tonneaux	1 904	52 677	1 843	55 090
26 to 49 tons - 26 à 49 tonneaux	218	23 941	277	38 483
50 to 99 tons - 50 à 99 tonneaux	116	27 942	122	35 948
100 to 149 tons - 100 à 149 tonneaux	33	12 795	33	13 620
150 to 499 tons - 150 à 499 tonneaux	121	99 431	123	103 232
500 tons and over - 500 tonneaux et plus	38	125 603	37	131 603
TOTAL	7 302	363 192	6 689	398 812
BY OVERALL LENGTH - PAR LONGUEUR HORS-TOUT				
25 TONS OR LESS - 25 TONNEAUX OU MOINS				
Under 20 feet - Moins de 20 pieds	2 249	3 818	1 878	3 259
20 to 24.9 feet - 20 à 24.9 pieds	483	2 005	436	1 847
25 to 29.9 feet - 25 à 29.9 pieds	1 015	5 469	919	5 673
30 to 34.9 feet - 30 à 34.9 pieds	872	8 346	836	9 252
35 to 39.9 feet - 35 à 39.9 pieds	1 282	23 414	1 199	25 146
40 to 44.9 feet - 40 à 44.9 pieds	845	29 320	820	30 507
45 feet and over - 45 pieds et plus	30	1 108	9	242
TOTAL	6 776	73 480	6 097	75 926
OVER 25 TONS - PLUS DE 25 TONNEAUX				
Under 45 feet - Moins de 45 pieds	100	12 156	180	26 394
45 to 64.9 feet - 45 à 64.9 pieds	233	42 969	218	51 724
65 to 89.9 feet - 65 à 89.9 pieds	20	6 278	19	6 203
90 to 99.9 feet - 90 à 99.9 pieds	30	11 870	31	14 100
100 to 124.9 feet - 100 à 124.9 pieds	78	63 987	80	67 263
125 to 149.9 feet - 125 à 149.9 pieds	36	50 252	36	49 002
150 feet and over - 150 pieds et plus	29	102 200	28	108 200
TOTAL	526	289 712	592	322 886

Source: Canadian Fisheries; Annual Statistical Review 1981

TABLE C-13

POTENTIAL SAR CLIENTS

SEA FISHERIES: NUMBER AND VALUE OF REGISTERED FISHING VESSELS, NEWFOUNDLAND, 1980 - 1981

PECHES MARITIMES: NOMBRE ET VALEUR DES BATEAUX DE PECHE ENREGISTRES, TERRE-NEUVE, 1980 - 1981

Value (V) in thousand dollars - Valeur (V) en milliers de dollars

TONNAGE AND LENGTH - JAUGE ET LONGUEUR	1980		1981	
	No.	V	No.	V
BY GROSS TONNAGE - PAR JAUGE BRUTE				
Under 10 tons - Moins de 10 tonneaux	18 197	43 301	15 619	43 024
10 to 24.9 tons - 10 à 24.9 tonneaux	1 034	37 055	1 046	38 307
25 to 49.9 tons - 25 à 49.9 tonneaux	267	23 748	274	25 039
50 to 99.9 tons - 50 à 99.9 tonneaux	89	21 277	99	23 610
100 to 149.9 tons - 100 à 149.9 tonneaux	8	2 608	8	2 308
150 tons and over - 150 tonneaux et plus	89	133 812	89	134 536
TOTAL	19 684	261 801	17 135	266 824
BY OVERALL LENGTH - PAR LONGUEUR HORS-TOUT				
Under 35 feet - Moins de 35 pieds	18 176	42 595	15 576	39 289
35 to 64.9 feet - 35 à 64.9 pieds	1 392	73 915	1 437	79 165
65 to 99.9 feet - 65 à 99.9 pieds	26	13 411	30	13 764
100 feet and over - 100 pieds et plus	90	131 880	92	134 606
TOTAL	19 684	261 801	17 135	266 824

Source: Canadian Fisheries; Annual Statistical Review 1981

POTENTIAL SAR CLIENTS

Table C-14

NUMBER OF VESSEL LICENCES ISSUED TO DECEMBER 31, 1983

PROVINCE	AVANT/PRIOR TO 1974	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL 31/12/
TERRE NEUVE NEWFOUNDLAND	6,379	297	505	560	3,456	2,780	2,569	2,209	3,304	2,059	1,783	25,901
ILE DU PRINCE-EDOUARD PRINCE EDWARD ISLAND	4,867	183	359	315	292	296	308	230	227	175	156	7,408
NOUVELLE-ECOSSE NOVA SCOTIA	31,001	1,748	1,734	1,780	1,754	2,116	1,952	1,612	1,366	1,296	757	47,116
NOUVEAU-BRUNSWICK NEW BRUNSWICK	17,196	1,014	1,366	1,073	1,142	1,540	1,709	1,423	1,188	1,005	616	29,272
QUEBEC QUEBEC	138,003	7,755	8,401	8,022	7,949	8,378	9,384	9,567	10,491	10,021	6,537	224,508
ONTARIO ONTARIO	578,370	38,473	36,650	35,790	32,701	36,822	33,723	34,168	32,130	29,681	14,400	902,908
MANITOBA MANITOBA	48,624	2,986	2,453	5,977	4,054	3,252	2,333	2,282	2,736	2,543	2,852	80,092
SASKATCHEWAN SASKATCHEWAN	35,372	3,426	3,429	4,035	3,960	3,851	3,902	3,768	3,617	3,191	1,802	70,353
ALBERTA ALBERTA	50,849	4,312	3,737	5,078	6,215	5,097	5,225	5,219	6,466	5,210	2,646	100,054
COLOMBIE-BRITANNIQUE BRITISH COLUMBIA	213,070	18,958	16,813	16,051	17,233	10,310	17,343	16,479	13,974	11,586	4,186	356,003
TERRITOIRE DU YUKON YUKON TERRITORY	2,094	127	164	135	126	114	82	96	75	59	67	3,139
TERRITOIRES DU NORD-OUEST NORTHWEST TERRITORIES	582	17	8	4	36	56	33	22	18	6	11	793
TOTAL	1,126,407	79,296	75,619	78,820	78,918	74,612	78,563	77,075	75,592	66,832	35,813	1,847,5

Immatriculation des navires,
Ministère des Transports, OTTAWA, Ont.

Ship Registratio
Transport Canada, OTTAWA, O

ANNEX D

TABLE D-1
FLYING HOURS - PRIMARY AIRCRAFT (M1+M2, A1+A2)
HALIFAX

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	401.4	944.8	286.0	274.4	788.9	257.4	311.8	195.5	99.3	3559.5
MARINE	184.0	516.3	471.9	678.6	297.1	379.4	458.5	681.1	354.6	4021.5
TOTAL	585.4	1461.1	757.9	953.0	1086.0	636.8	770.3	876.6	453.9	7581.0

TRENTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	694.8	531.3	697.8	509.5	507.4	527.2	704.1	252.2	272.9	4697.2
MARINE	125.3	110.7	38.2	201.5	172.5	123.3	89.7	137.6	57.7	1056.5
TOTAL	820.1	642.0	736.0	711.0	679.9	650.5	793.8	389.8	330.6	5753.7

EDMONTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	1395.4	760.0	1513.6	1048.4	1221.8	600.6	1308.8	2557.0	197.6	10603.2
MARINE	0.0	0.0	0.0	17.9	0.0	7.8	10.2	0.0	0.0	35.9
TOTAL	1395.4	760.0	1513.6	1066.3	1221.8	608.4	1319.0	2557.0	197.6	10639.1

VICTORIA

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	1178.9	1565.1	907.2	2330.1	1109.4	460.0	1796.9	2102.7	2065.4	13515.7
MARINE	194.5	164.3	279.7	338.7	213.6	379.5	195.8	215.9	172.2	2154.2
TOTAL	1373.4	1729.4	1186.9	2668.8	1323.0	839.5	1992.7	2318.6	2237.6	15669.9

NATIONAL

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	3670.5	3801.2	3404.6	4162.4	3627.5	1845.2	4121.6	5107.4	2635.2	32375.6
MARINE	503.8	791.3	789.8	1236.7	683.2	890.0	754.2	1034.6	584.5	7268.1
TOTAL	4174.3	4592.5	4194.4	5399.1	4310.7	2735.2	4875.8	6142.0	3219.7	39643.7

Source: DND SARSTATS

TABLE D-2
PRIMARY FIXED WING FLYING HOURS (M1+M2, A1+A2)

HALIFAX

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	223.3	604.2	163.9	158.5	438.3	148.5	129.1	76.6	41.0	1983.4
MARINE	131.6	313.8	220.4	335.7	95.8	166.5	236.3	406.0	172.4	2078.5
TOTAL	354.9	918.0	384.3	494.2	534.1	315.0	365.4	482.6	213.4	4061.9

TRENTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	514.2	167.6	324.1	200.7	216.4	236.3	240.6	115.8	115.9	2131.6
MARINE	78.2	22.0	3.8	56.8	89.8	49.3	28.0	42.9	22.2	393.0
TOTAL	592.4	189.6	327.9	257.5	306.2	285.6	268.6	158.7	138.1	2524.6

EDMONTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	1392.1	709.1	1303.0	1030.1	1221.8	600.6	1308.8	2264.5	183.4	10013.4
MARINE	0.0	0.0	0.0	17.9	0.0	7.8	10.2	0.0	0.0	35.9
TOTAL	1392.1	709.1	1303.0	1048.0	1221.8	608.4	1319.0	2264.5	183.4	10049.3

VICTORIA

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	785.2	1007.5	582.2	1457.2	839.2	302.0	1004.7	1399.6	1382.0	8759.6
MARINE	100.8	86.4	133.2	181.5	105.5	191.9	117.8	111.8	71.9	1100.8
TOTAL	886.0	1093.9	715.4	1638.7	944.7	493.9	1122.5	1511.4	1453.9	9860.4

NATIONAL

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	2914.8	2488.4	2373.2	2846.5	2715.7	1287.4	2683.2	3856.5	1722.3	22888.0
MARINE	310.6	422.2	357.4	591.9	291.1	415.5	392.3	560.7	266.5	3608.2
TOTAL	3225.4	2910.6	2730.6	3438.4	3006.8	1702.9	3075.5	4417.2	1988.8	26496.2

Source: DND SARSTATS

TABLE D-3
PRIMARY ROTARY WING FLYING HOURS (M1+M2, A1+A2)

HALIFAX

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	178.1	340.6	122.1	115.9	350.6	108.9	182.7	118.9	58.3	1576.1
MARINE	52.4	202.5	251.5	342.9	201.3	212.9	222.2	275.1	182.2	1943.0
TOTAL	230.5	543.1	373.6	458.8	551.9	321.8	404.9	394.0	240.5	3519.1

TRENTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	180.6	363.7	373.7	308.8	291.0	290.9	463.5	136.4	157.0	2565.6
MARINE	47.1	88.7	34.4	144.7	82.7	74.0	61.7	94.7	35.5	663.5
TOTAL	227.7	452.4	408.1	453.5	373.7	364.9	525.2	231.1	192.5	3229.1

EDMONTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	3.3	50.9	210.6	18.3	0.0	0.0	0.0	292.5	14.2	589.8
MARINE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TOTAL	3.3	50.9	210.6	18.3	0.0	0.0	0.0	292.5	14.2	589.8

VICTORIA

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	393.7	557.6	325.0	872.9	270.2	158.0	792.2	703.1	683.4	4756.1
MARINE	93.7	77.9	146.5	157.2	108.1	187.6	78.0	104.1	100.3	1053.4
TOTAL	487.4	635.5	471.5	1030.1	378.3	345.6	870.2	807.2	783.7	5809.5

NATIONAL

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	755.7	1312.8	1031.4	1315.9	911.8	557.8	1438.4	1250.9	912.9	9487.6
MARINE	193.2	369.1	432.4	644.8	392.1	474.5	361.9	473.9	318.0	3659.9
TOTAL	948.9	1681.9	1463.8	1960.7	1303.9	1032.3	1800.3	1724.8	1230.9	13147.5

Source: DND SARSTATS

TABLE D-4
FLYING HOURS - SECONDARY AIRCRAFT (M1+M2, A1+A2)

HALIFAX

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	50.7	107.8	74.8	103.5	130.6	97.5	23.1	46.1	7.3	641.4
MARINE	59.8	381.9	278.0	165.3	96.3	127.0	128.0	131.6	70.3	1438.2
TOTAL	110.5	489.7	352.8	268.8	226.9	224.5	151.1	177.7	77.6	2079.6

TRENTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	188.5	440.9	1582.6	197.3	325.8	259.3	556.2	101.3	167.4	3819.3
MARINE	16.5	10.2	9.6	37.1	26.9	29.4	9.7	2.5	3.0	144.9
TOTAL	205.0	451.1	1592.2	234.4	352.7	288.7	565.9	103.8	170.4	3964.2

EDMONTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	1221.6	282.9	425.0	496.4	263.8	120.3	86.4	936.0	45.5	3877.9
MARINE	0	0	0	0	0	2.3	6.0	0	0	8.3
TOTAL	1221.6	282.9	425.0	496.4	263.8	122.6	92.4	936.0	45.5	3886.2

VICTORIA

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	29.6	143.7	79.8	626.4	196.9	43.9	235.3	413.7	497.3	2266.6
MARINE	102.3	69.2	87.2	260.7	93.2	63.8	43.7	32.7	49.6	802.4
TOTAL	131.9	212.9	167.0	887.1	290.1	107.7	279.0	446.4	546.9	3069.0

NATIONAL

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	1490.4	975.3	2162.2	1423.6	917.1	521.0	901.0	1497.1	717.5	10605.2
MARINE	178.6	461.3	374.8	463.1	216.4	222.5	187.4	166.8	122.9	2393.8
TOTAL	1669.0	1436.6	2537.0	1886.7	1133.5	743.5	1088.4	1663.9	840.4	12999.0

Source: DND SARSTATS

TABLE D-5
FLYING HOURS - NON SAR AIRCRAFT (M1+M2, A1+A2)

HALIFAX

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	16.6	61.3	0	4.5	5.3	64.1	6.7	16.1	19.1	193.7
MARINE	10.6	10.2	2.0	80.3	13.4	5.5	80.3	86.3	10.2	298.8
TOTAL	27.2	71.5	2.0	84.8	18.7	69.6	87.0	102.4	29.3	492.5

TRENTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	230.2	40.0	112.5	70.3	106.2	551.7	338.5	92.1	222.8	1764.3
MARINE	35.7	88.6	60.3	89.8	133.3	41.9	64.1	38.8	31.4	583.9
TOTAL	265.9	128.6	172.8	160.1	239.5	593.6	402.6	130.9	254.2	2348.2

EDMONTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	147.5	269.7	387.6	747.6	1043.6	517.6	245.6	1510.8	61.0	4931.0
MARINE	0	0	0	0	0	0	0	0	0	0
TOTAL	147.5	269.7	387.6	747.6	1043.6	517.6	245.6	1510.8	61.0	4931.0

VICTORIA

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	468.8	847.8	425.2	695.1	610.4	369.1	2235.9	1232.6	1652.7	8537.6
MARINE	92.0	63.2	40.5	72.0	65.5	59.9	31.3	17.2	24.2	465.8
TOTAL	560.8	911.0	465.7	767.1	675.9	429.0	2267.2	1249.8	1676.9	9003.4

NATIONAL

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	863.1	1218.8	925.3	1517.5	1765.5	1502.5	2826.7	2851.6	1955.6	15426.6
MARINE	138.3	162.0	102.8	242.1	212.2	107.3	175.7	142.3	65.8	1348.5
TOTAL	1001.4	1380.8	1028.1	1759.6	1977.7	1609.8	3002.4	2993.9	2021.4	16775.1

Source: DND SARSTATS

TABLE D-6
FLYING TIMES - ALL AIRCRAFT (M1+M2, A1+A2)

HALIFAX

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	468.7	1113.9	360.8	382.4	924.8	419.0	341.6	257.7	125.7	4394.6
MARINE	254.4	908.4	751.9	924.2	406.8	511.9	666.8	899.0	435.1	5758.5
TOTAL	723.1	2022.3	1112.7	1306.6	1331.6	930.9	1008.4	1156.7	560.8	10153.1

TRENTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	1113.5	1012.2	2392.9	777.1	939.4	1338.2	1598.8	445.6	663.1	10280.8
MARINE	177.5	209.5	108.1	328.4	332.7	194.6	163.5	178.9	92.1	1785.3
TOTAL	1291.0	1221.7	2501.0	1105.5	1272.1	1532.8	1762.3	624.5	755.2	12066.1

EDMONTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	2764.5	1312.6	2326.2	2292.4	2529.2	1238.5	1640.8	5003.8	304.1	19412.1
MARINE	0.0	0.0	0.0	17.9	0.0	10.1	16.2	0.0	0.0	44.2
TOTAL	2764.5	1312.6	2326.2	2310.3	2529.2	1248.6	1657.0	5003.8	304.1	19456.3

VICTORIA

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	1677.3	2556.6	1412.2	3651.6	1916.7	873.0	4268.1	3749.0	4215.4	24319.9
MARINE	388.8	296.7	407.4	671.4	372.3	503.2	270.8	265.8	246.0	3422.4
TOTAL	2066.1	2853.3	1819.6	4323.0	2289.0	1376.2	4538.9	4014.8	4461.4	27742.3

NATIONAL

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	6024.0	5995.3	6492.1	7103.5	6310.1	3868.7	7849.3	9456.1	5308.3	58407.4
MARINE	820.7	1414.6	1267.4	1941.9	1111.8	1219.8	1117.3	1343.7	773.2	11010.4
TOTAL	6844.7	7409.9	7759.5	9045.4	7421.9	5088.5	8966.6	10799.8	6081.5	69417.8

Source: DND SARSTATS

TABLE D-7
PRIMARY MARINE VESSEL HOURS (M1+M2, A1+A2)

HALIFAX

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	57.1	71.4	5.3	0	44.8	0	43.0	1.8	0	223.4
MARINE	185.7	211.3	178.7	443.0	204.1	295.1	685.8	582.6	330.3	3116.6
TOTAL	242.8	282.7	184.0	443.0	248.9	295.1	728.8	584.4	330.3	3340.0

TRENTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	2.1	8.2	13.2	0	2.3	38.9	3.8	0	1.5	70.0
MARINE	294.8	164.7	213.7	281.6	270.3	290.1	159.4	281.5	166.1	2122.2
TOTAL	296.9	172.9	226.9	281.6	272.6	329.0	163.2	281.5	167.6	2192.2

EDMONTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	0	0	0	0	0	0	0	0	0	0
MARINE	0	0	0	4.0	11.6	35.8	.5	8.0	13.3	73.2
TOTAL	0	0	0	4.0	11.6	35.8	.5	8.0	13.3	73.2

VICTORIA

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	1.1	71.5	43.4	238.2	21.1	51.8	146.4	35.1	90.8	699.4
MARINE	497.5	383.3	352.9	814.2	476.6	543.9	378.7	456.7	550.8	4454.6
TOTAL	498.6	454.8	396.3	1052.4	497.7	595.7	525.1	491.8	641.6	5154.0

NATIONAL

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	60.3	151.1	61.9	238.2	68.2	90.7	193.2	36.9	92.3	992.8
MARINE	978.0	759.3	745.3	1542.8	962.6	1164.9	1224.4	1328.8	1060.5	9766.6
TOTAL	1038.3	910.4	807.2	1781.0	1030.8	1255.6	1417.6	1365.7	1152.8	10759.4

Source: DND SARSTATS

TABLE D-8
SECONDARY MARINE VESSEL HOURS (M1+M2, A1+A2)

HALIFAX

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	0	0	6.6	7.6	16.6	16.5	0	2.0	0	49.3
MARINE	275.8	730.0	524.7	289.0	326.2	313.9	257.1	805.9	364.3	3886.9
TOTAL	275.8	730.0	531.3	296.6	342.8	330.4	257.1	807.9	364.3	3936.2

TRENTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	0	0	2.8	0	0	12.7	0	0	39.1	54.6
MARINE	10.8	33.8	94.5	107.5	91.8	28.3	12.3	4.8	14.7	398.5
TOTAL	10.8	33.8	97.3	107.5	91.8	41.0	12.3	4.8	53.8	453.1

EDMONTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	0	0	0	0	0	0	0	0	0	0
MARINE	0	0	0	0	0	2.2	35.2	0	0	37.4
TOTAL	0	0	0	0	0	2.2	35.2	0	0	37.4

VICTORIA

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	8.4	46.5	.4	47.8	18.9	12.2	.5	0	.5	135.2
MARINE	348.0	153.0	84.3	498.5	300.3	206.4	12.8	40.6	65.0	1708.9
TOTAL	356.4	199.5	84.7	546.3	319.2	218.6	13.3	40.6	65.5	1844.1

NATIONAL

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	8.4	46.5	9.8	55.4	35.5	41.4	.5	2.0	39.6	239.1
MARINE	634.6	916.8	703.5	895.0	718.3	550.8	317.4	851.3	444.0	6031.7
TOTAL	643.0	963.3	713.3	950.4	753.8	592.2	317.9	853.3	483.6	6270.8

Source: DND SARSTATS

TABLE D-9
NON SAR VESSEL HOURS (M1+M2, A1+A2)

HALIFAX

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	5.0	0	0	0	8.4	0	.4	0	0	13.8
MARINE	79.1	9.9	0	22.0	159.8	96.6	501.3	1597.2	589.9	3055.8
TOTAL	84.1	9.9	0	22.0	168.2	96.6	501.7	1597.2	589.9	3069.6

TRENTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	1.1	6.4	6.0	0	5.8	0	25.6	14.3	2.8	62.0
MARINE	178.8	292.9	316.7	310.9	347.6	132.3	187.0	273.9	182.2	2222.3
TOTAL	179.9	299.3	322.7	310.9	353.4	132.3	212.6	288.2	185.0	2284.3

EDMONTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	0	0	0	0	0	0	0	0	0	0
MARINE	0	0	0	0	0	0	0	0	4.8	4.8
TOTAL	0	0	0	0	0	0	0	0	4.8	4.8

VICTORIA

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	0	13.0	2.7	39.2	36.2	7.5	126.2	42.6	44.4	311.8
MARINE	442.5	264.8	365.7	529.6	292.2	1063.8	606.6	927.5	1098.3	5591.0
TOTAL	442.5	277.8	368.4	568.8	328.4	1071.3	732.8	970.1	1142.7	5902.8

NATIONAL

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	6.1	19.4	8.7	39.2	50.4	7.5	152.2	56.9	47.2	387.6
MARINE	700.4	567.6	682.4	862.5	799.6	1292.7	1294.9	2798.6	1875.2	10873.9
TOTAL	706.5	587.0	691.1	901.7	850.0	1300.2	1447.1	2855.5	1922.4	11261.5

Source: DND SARSTATS

TABLE D-10
TOTAL MARINE CRAFT HOURS (M1+M2, A1+A2)

HALIFAX

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	62.1	71.4	11.9	7.6	69.8	16.5	43.4	3.8	0	286.5
MARINE	540.6	951.2	703.4	754.0	690.1	705.6	1444.2	2985.7	1284.5	10059.3
TOTAL	602.7	1022.6	715.3	761.6	759.9	722.1	1487.6	2989.5	1284.5	10345.8

TRENTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	3.2	14.6	22.0	0	8.1	51.6	29.4	14.3	43.4	186.6
MARINE	484.4	491.4	624.9	700.0	709.7	450.7	358.7	560.2	363.0	4743.0
TOTAL	487.6	506.0	646.9	700.0	717.8	502.3	388.1	574.5	406.4	4929.6

EDMONTON

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	0	0	0	0	0	0	0	0	0	0
MARINE	0	0	0	4.0	11.6	38.0	35.7	8.0	18.1	115.4
TOTAL	0	0	0	4.0	11.6	38.0	35.7	8.0	18.1	115.4

VICTORIA

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	9.5	131.0	46.5	325.2	76.2	71.5	273.1	77.7	135.7	1146.4
MARINE	1288.0	801.1	802.9	1842.3	1069.1	1814.1	998.1	1424.8	1714.1	11754.5
TOTAL	1297.5	932.1	849.4	2167.5	1145.3	1885.6	1271.2	1502.5	1849.8	12900.9

NATIONAL

CATEGORY	1975	1976	1977	1978	1979	1980	1981	1982	1983	TOTAL
AIR	74.8	217.0	80.4	332.8	154.1	139.6	345.9	95.8	179.1	1619.5
MARINE	2313.0	2243.7	2131.2	3300.3	2480.5	3008.4	2836.7	4978.7	3379.7	26672.2
TOTAL	2387.8	2460.7	2211.6	3633.1	2634.6	3148.0	3182.6	5074.5	3558.8	28291.7

Source: DND SARSTATS

TABLE D-11
HALIFAX REGION

MARINE DISTRESS INCIDENTS (M1+M2)

SUB AREA	AVERAGE 1976-1980	AVERAGE 1981-1983
001	1.8	4.3
002	1.4	8.0
004	7.8	19.3
005	2.8	8.3
006	1.4	10.3
007	6.8	22.0
008	5.0	14.0
009	1.4	3.0
010		1.0
011	7.0	3.3
031	3.2	5.7
032	5.4	6.7
033	3.4	6.0
034	3.4	6.3
NO AREA ASSIGNED	2.4	3.3
	53.2	121.6

Source: DND SARSTATS

TABLE D-12
TRENTON REGION

MARINE DISTRESS INCIDENTS (M1+M2)

SUB AREA	AVERAGE 1976-1980	AVERAGE 1981+1982
100	4.2	2.0
101	1.8	2.0
102	2.0	3.0
103	7.8	8.0
104	10.2	11.0
105	10.4	13.5
106	6.4	5.0
107	10.2	6.0
108	13.0	11.0
109	9.6	8.5
110	4.2	2.0
140	8.0	16.0
141	9.4	11.0
NO ASSIGNED AREA	4.8	5.0
	102.0	104.0

Source: DND SARSTATS

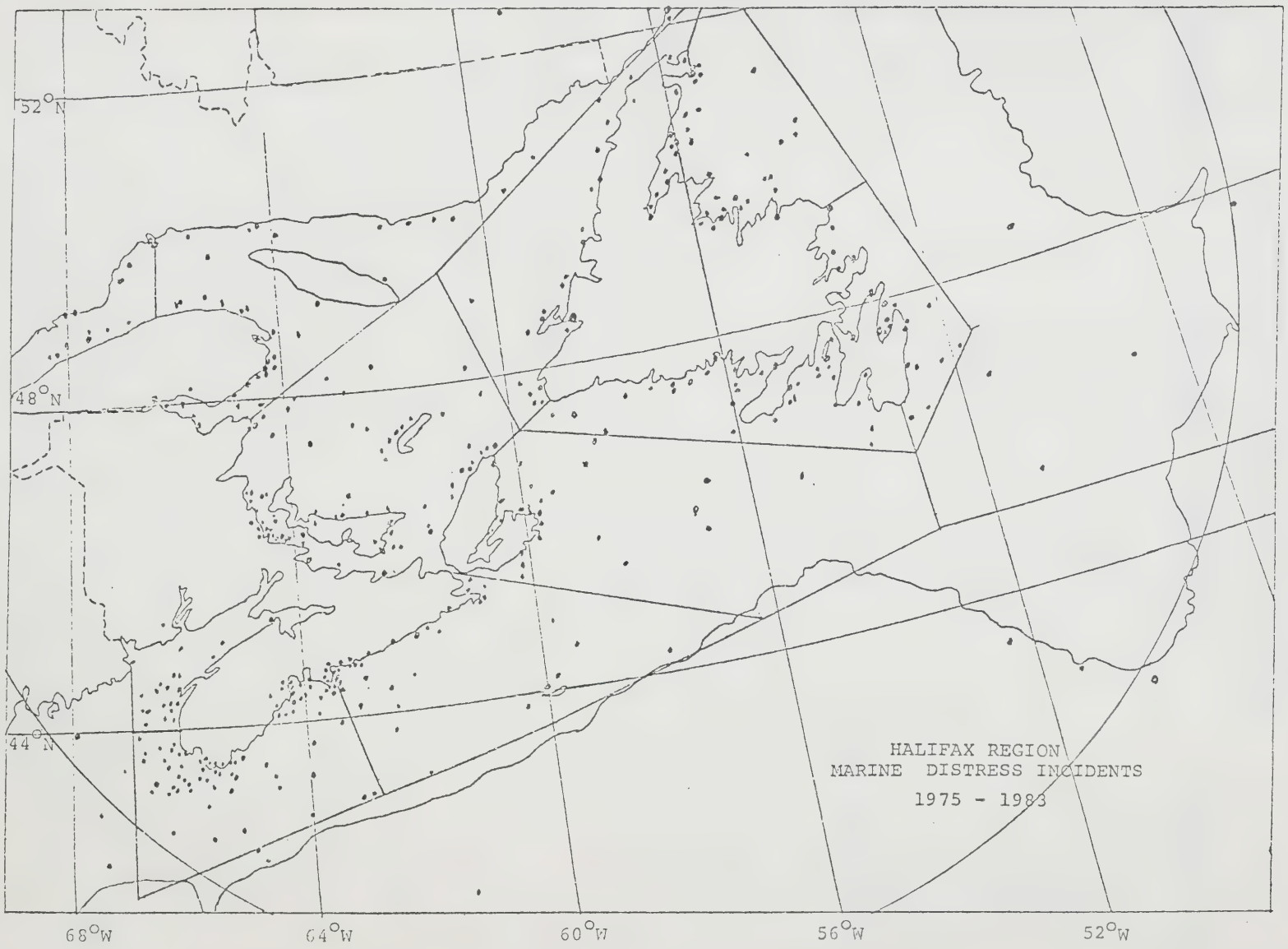
TABLE D-13
VICTORIA REGION

MARINE DISTRESS INCIDENTS (M1+M2)

SUB AREA	AVERAGE 1976-1980	AVERAGE 1981+1982
301	18.4	16.5
302	8.8	10.0
303	66.4	65.0
304	25.0	27.5
305	20.8	25.0
306	18.2	24.0
307	24.8	19.5
308	1.2	1.0
NO ASSIGNED AREA	2.6	1.5
	186.2	190.0

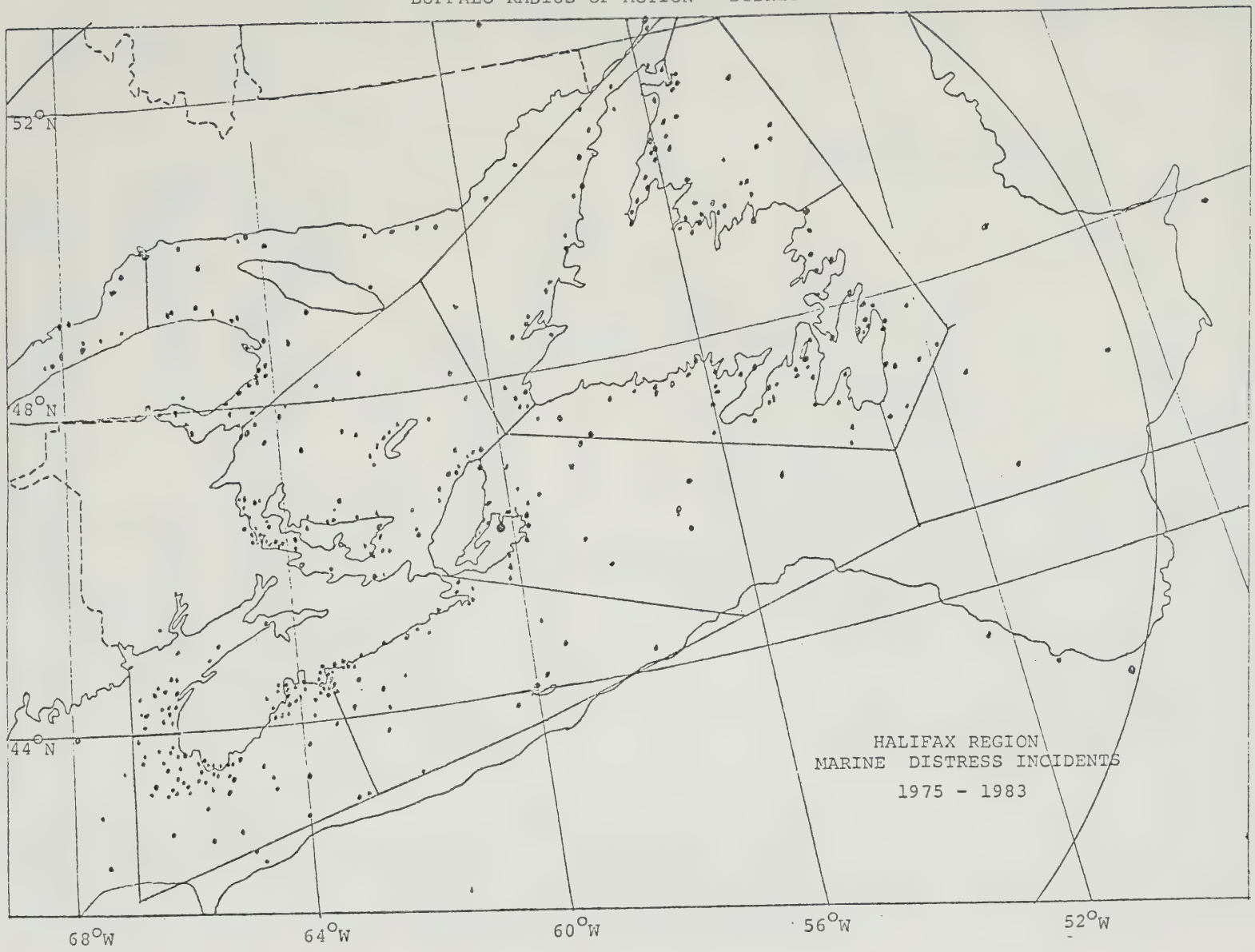
Source: DND SARSTATS

BUFFALO RADIUS OF ACTION - STEPHENVILLE Figure D-1

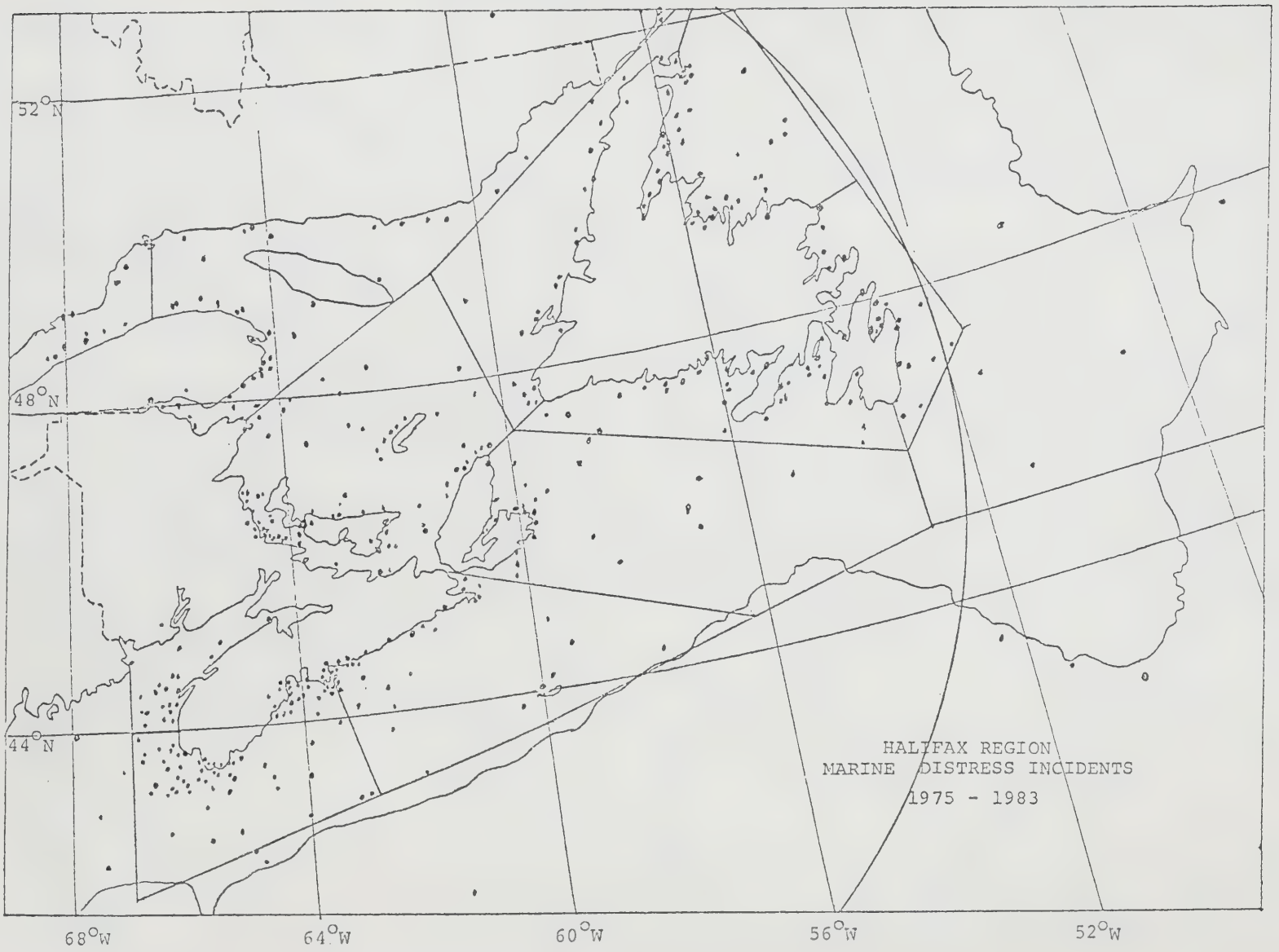


BUFFALO RADIUS OF ACTION - SYDNEY

Figure D-2

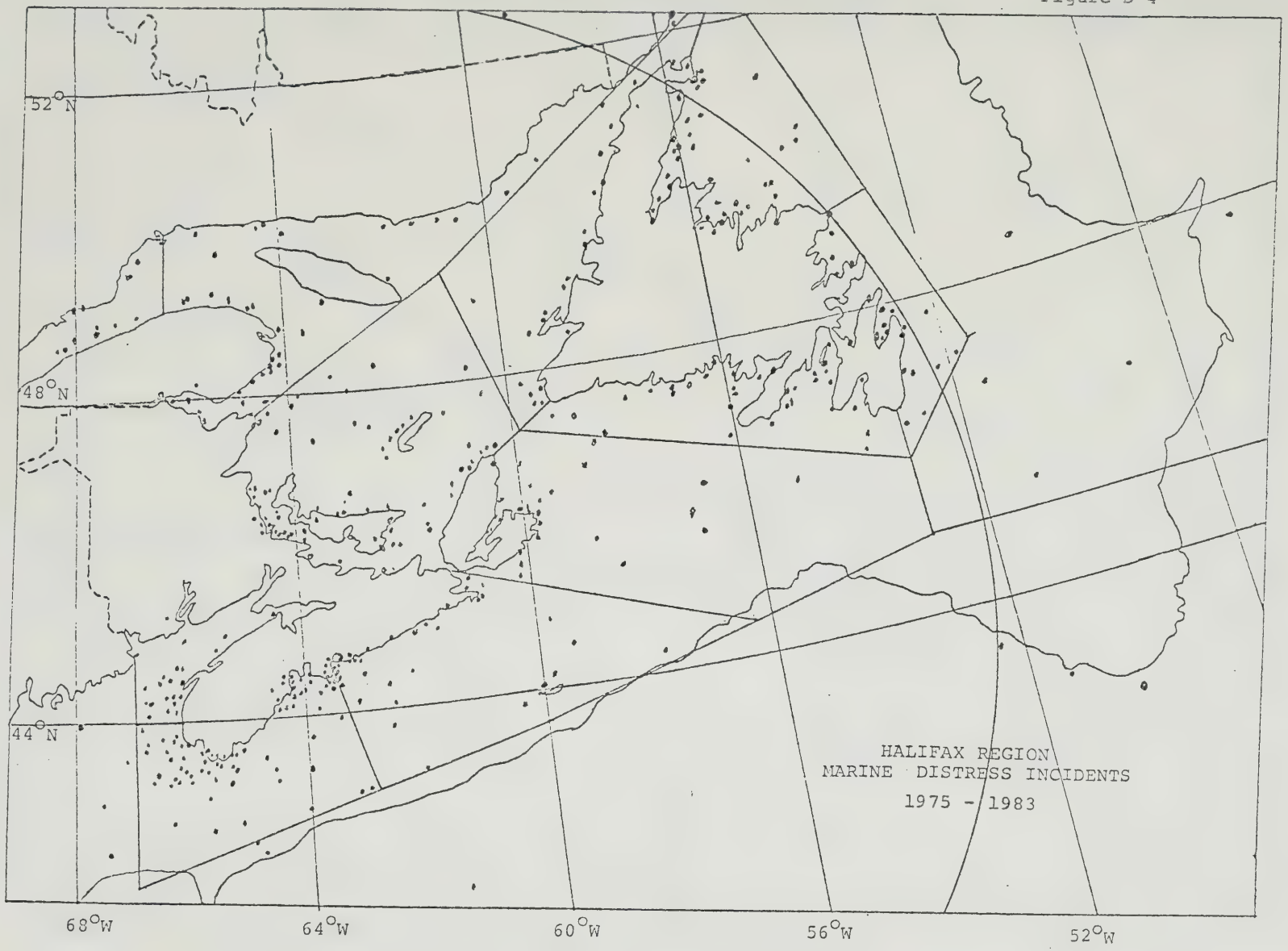


BUFFALO RADIUS OF ACTION - SUMMERSIDE Figure D-3



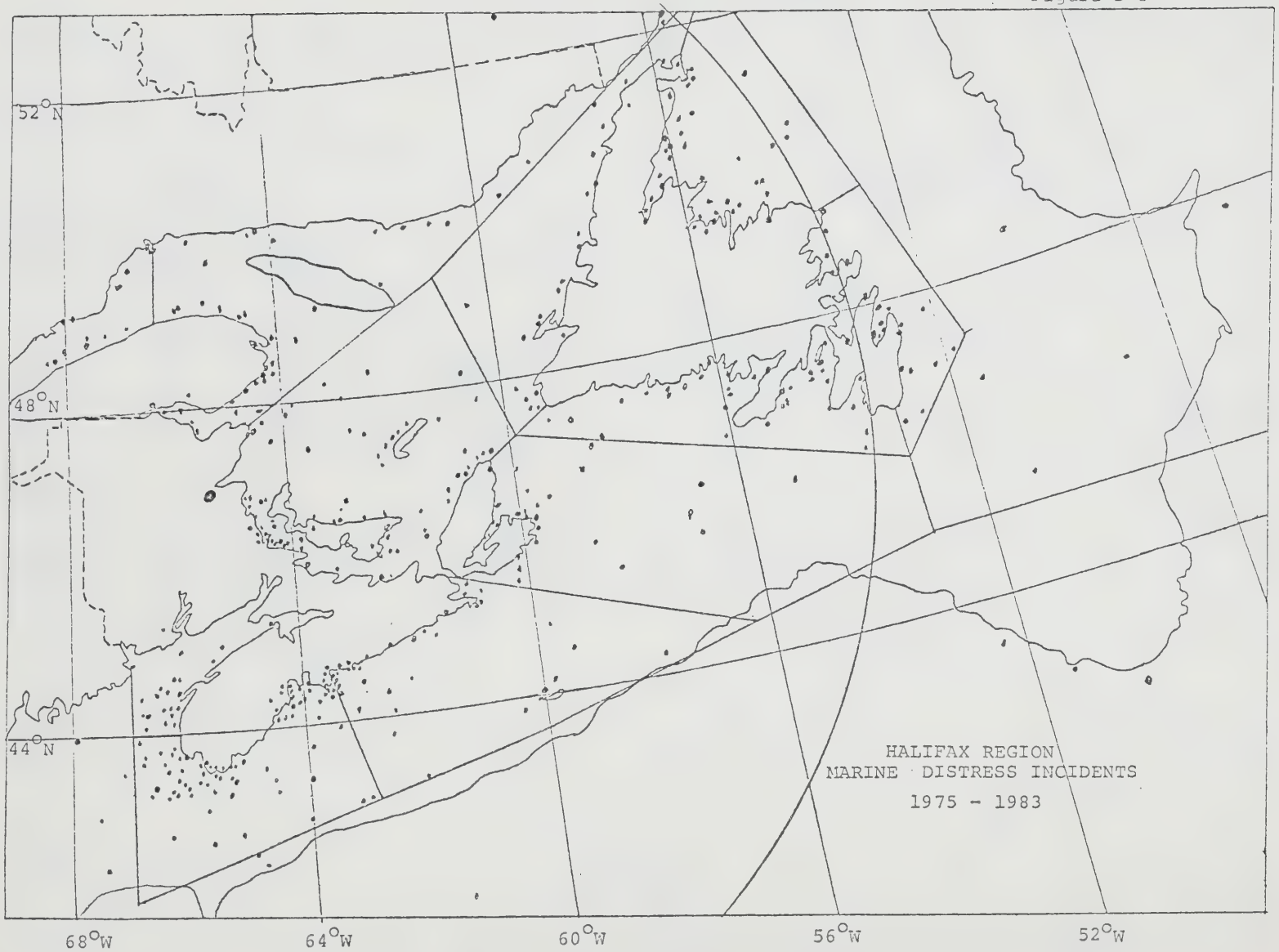
BUFFALO RADIUS OF ACTION - SHEARWATER

Figure D-4



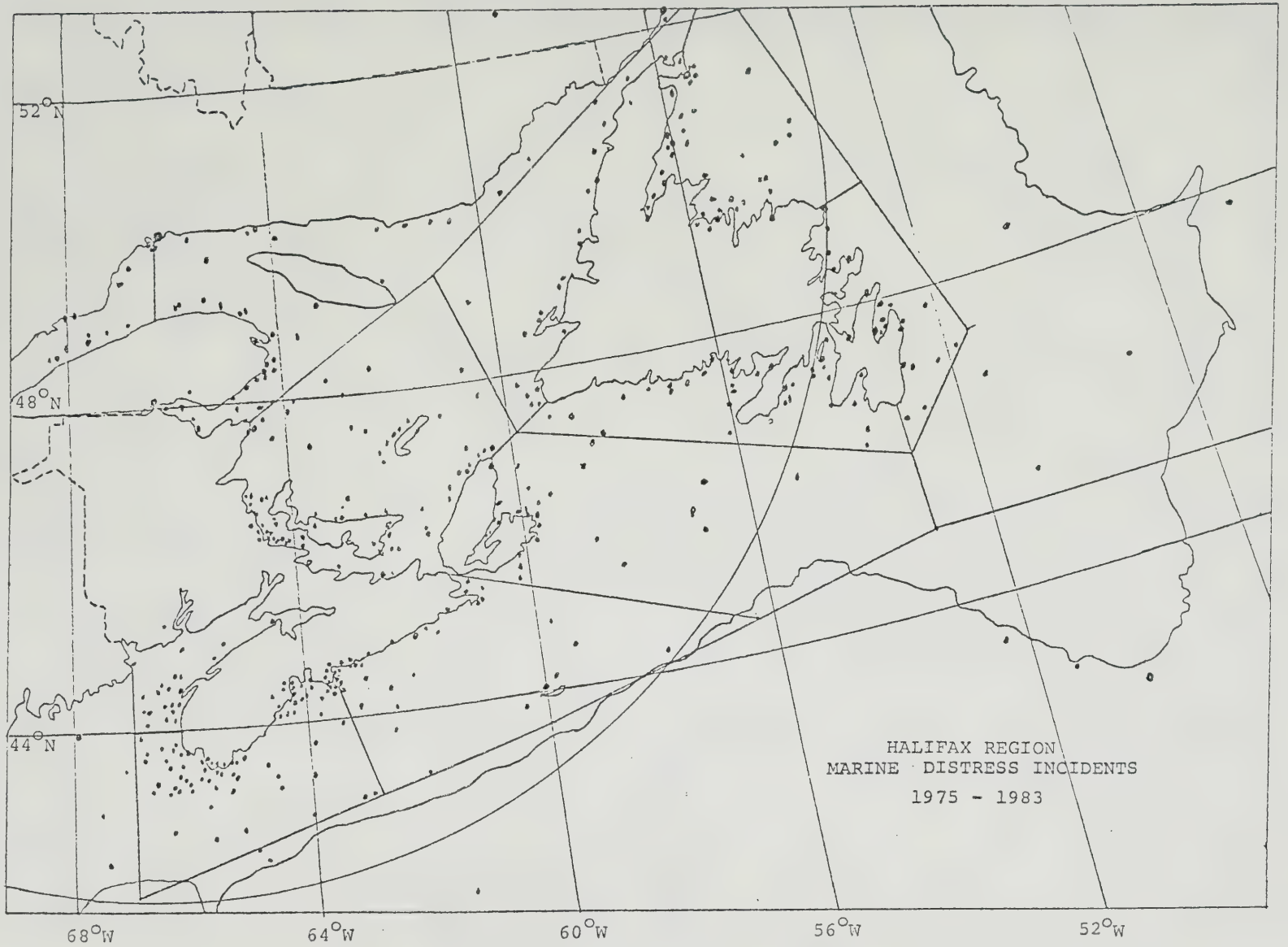
BUFFALO RADIUS OF ACTION - CHATHAM

Figure D-5



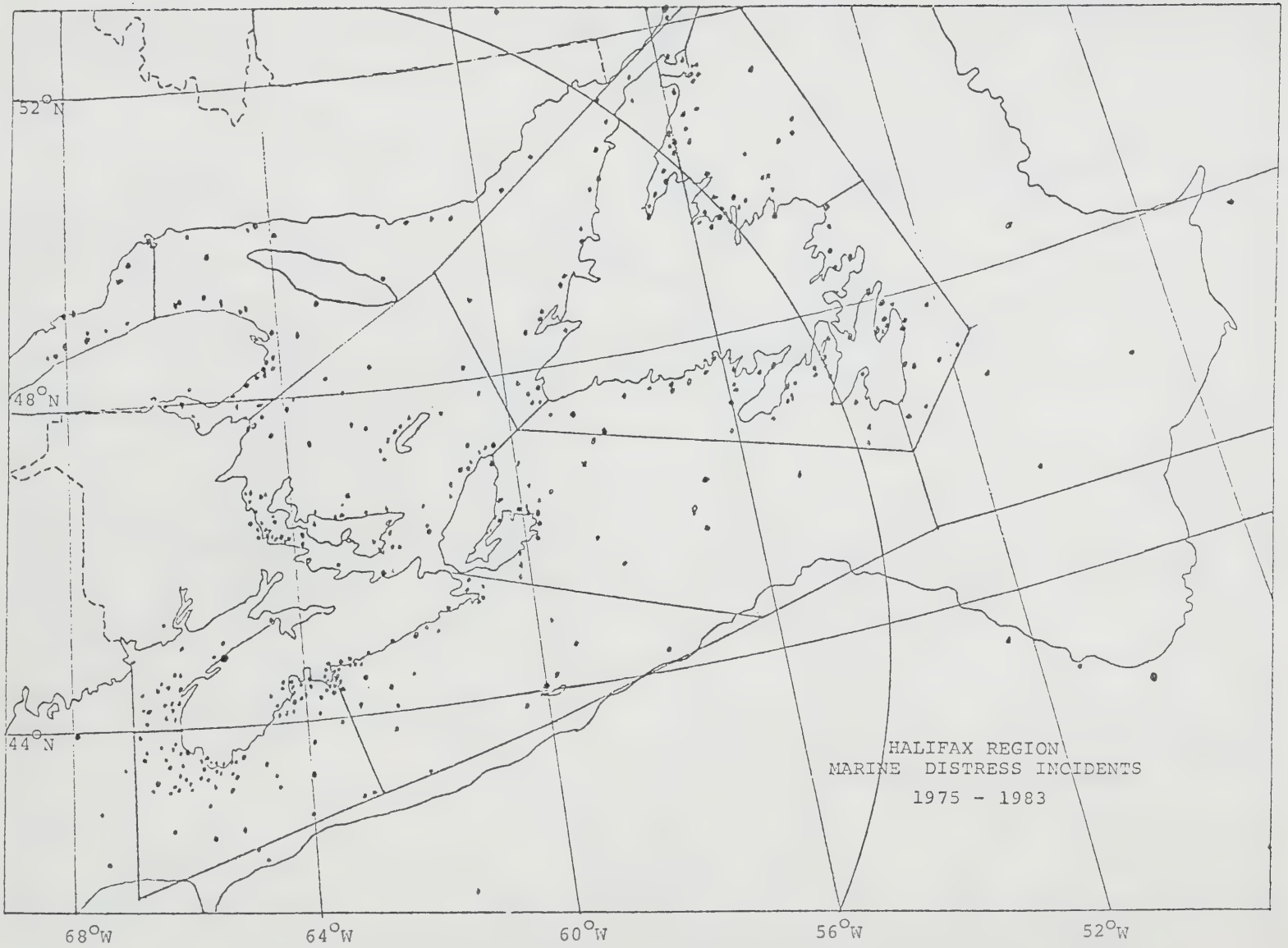
BUFFALO RADIUS OF ACTION - STEVEN ISLANDS

Figure D-6



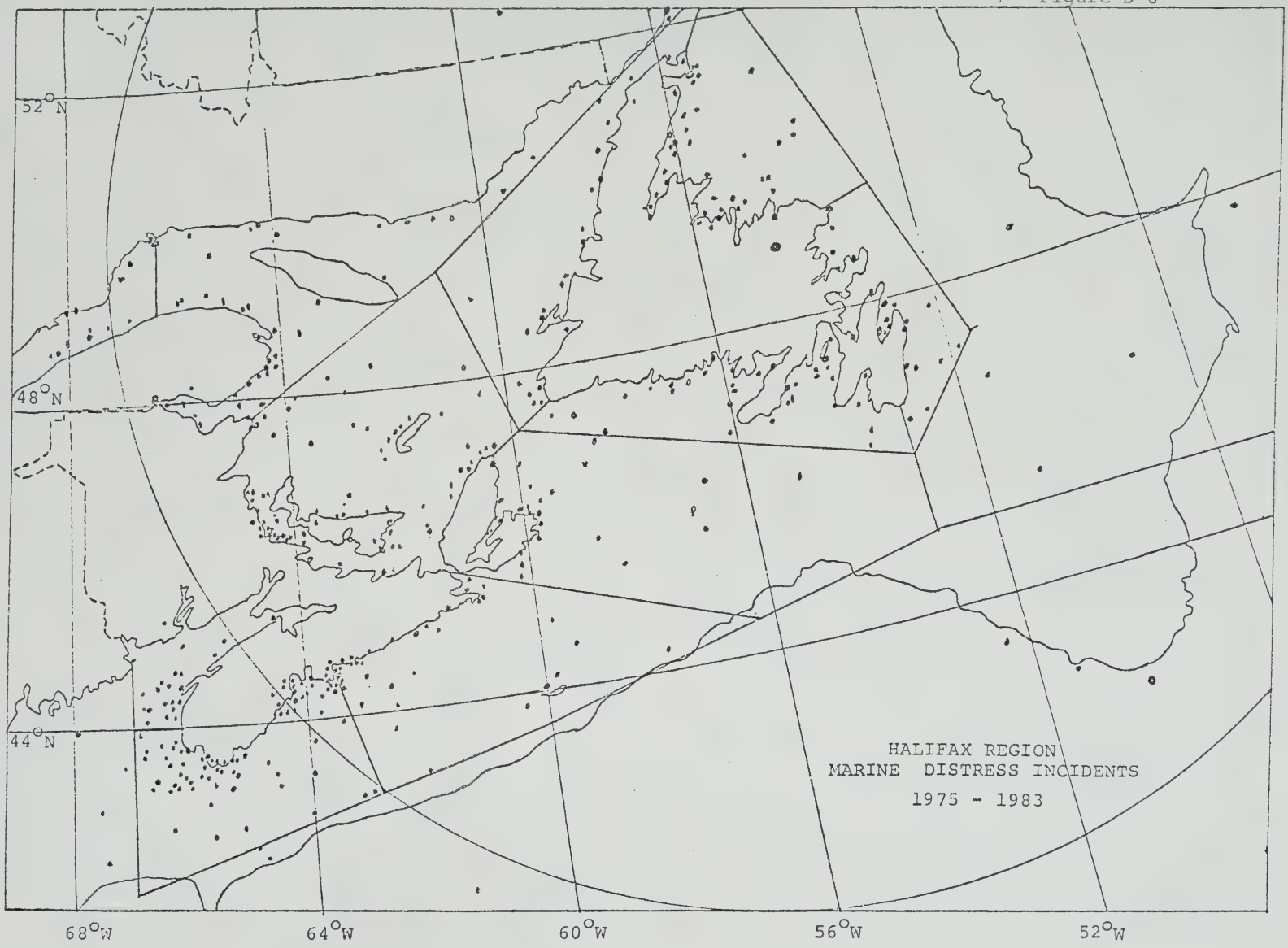
BUFFALO RADIUS OF ACTION - GREENWOOD

Figure D-7

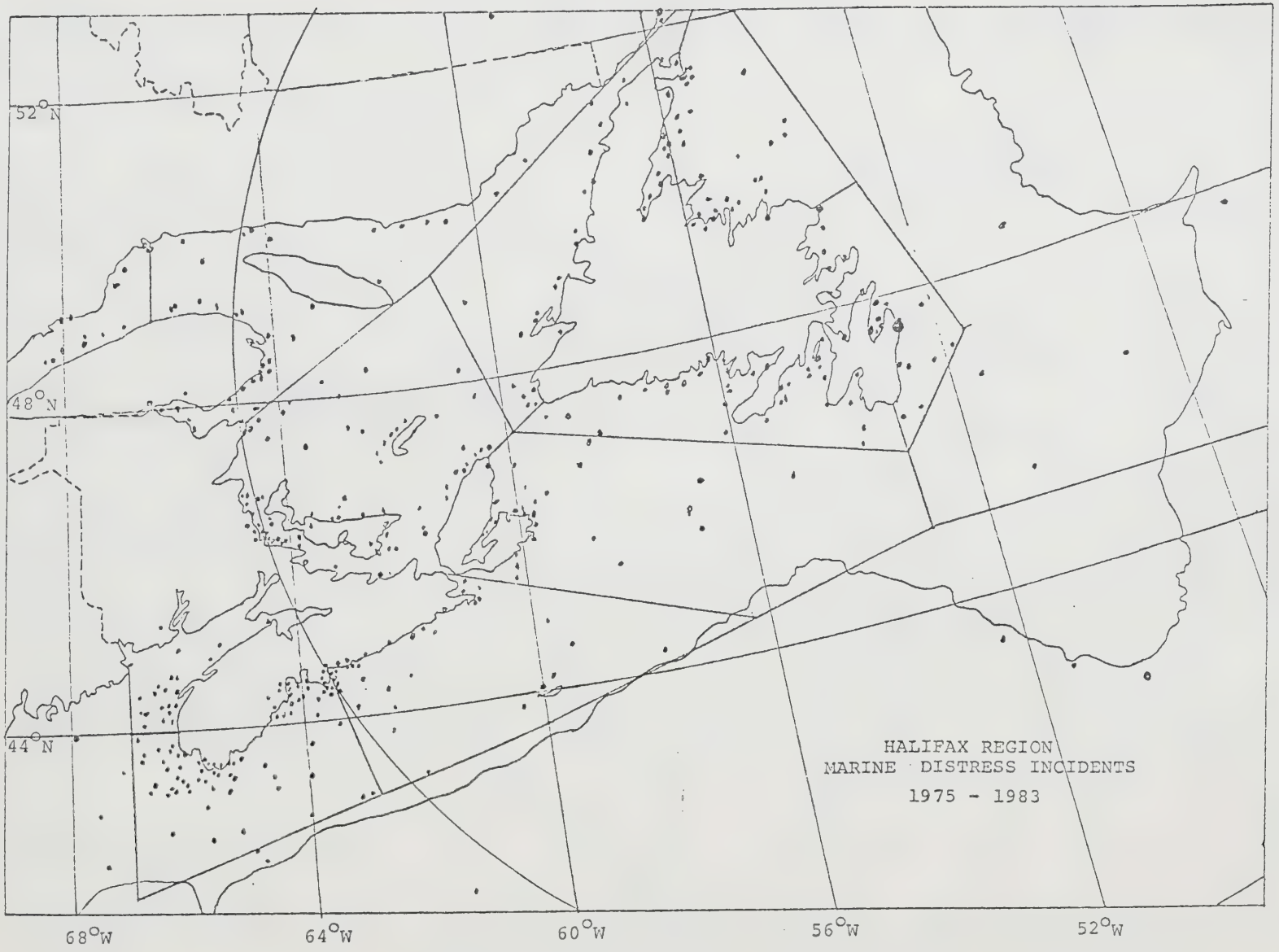


BUFFALO RADIUS OF ACTION - GANDER

Figure D-8

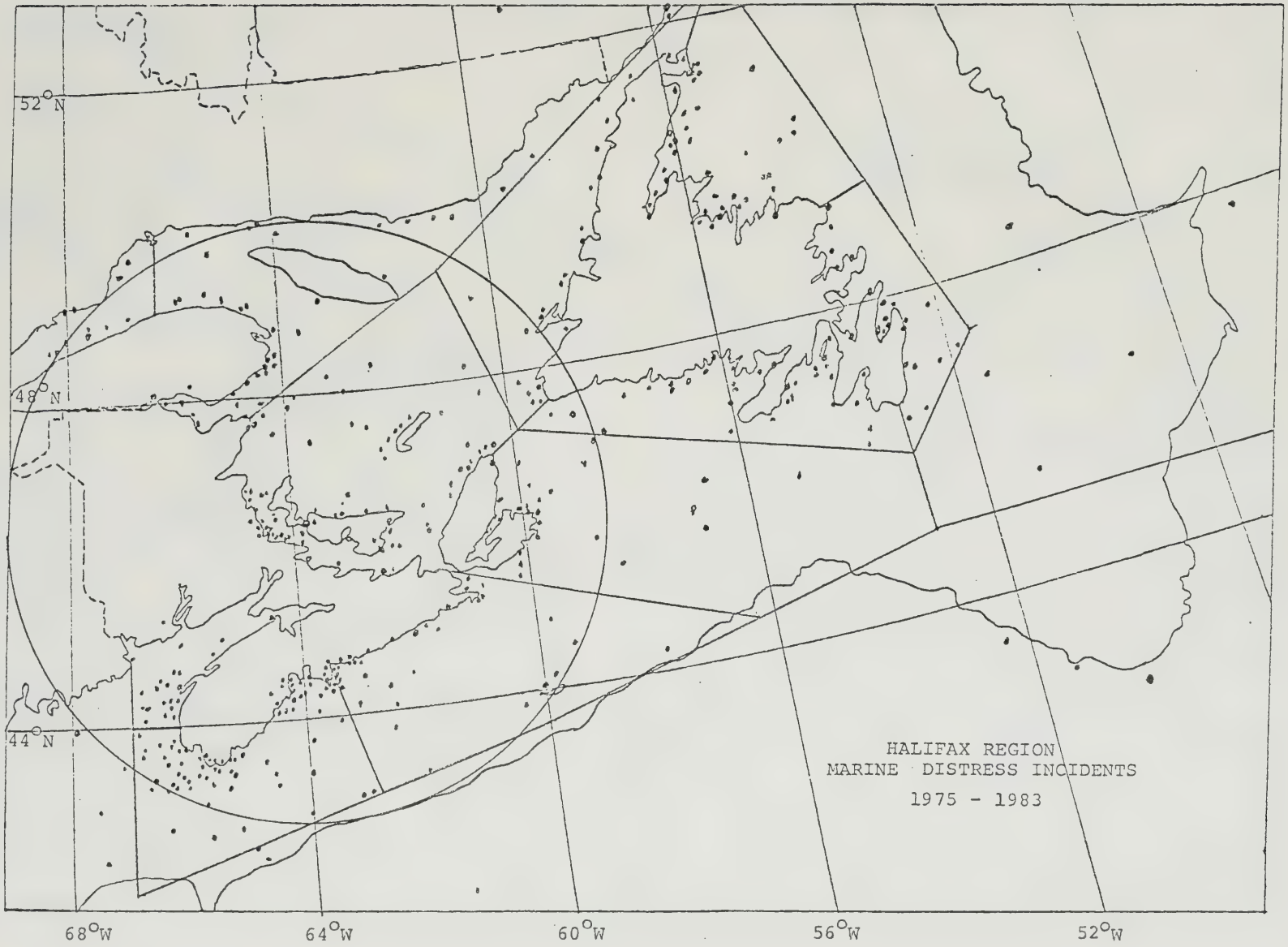


BUFFALO RADIUS OF ACTION - ST. JOHN'S Figure D-9



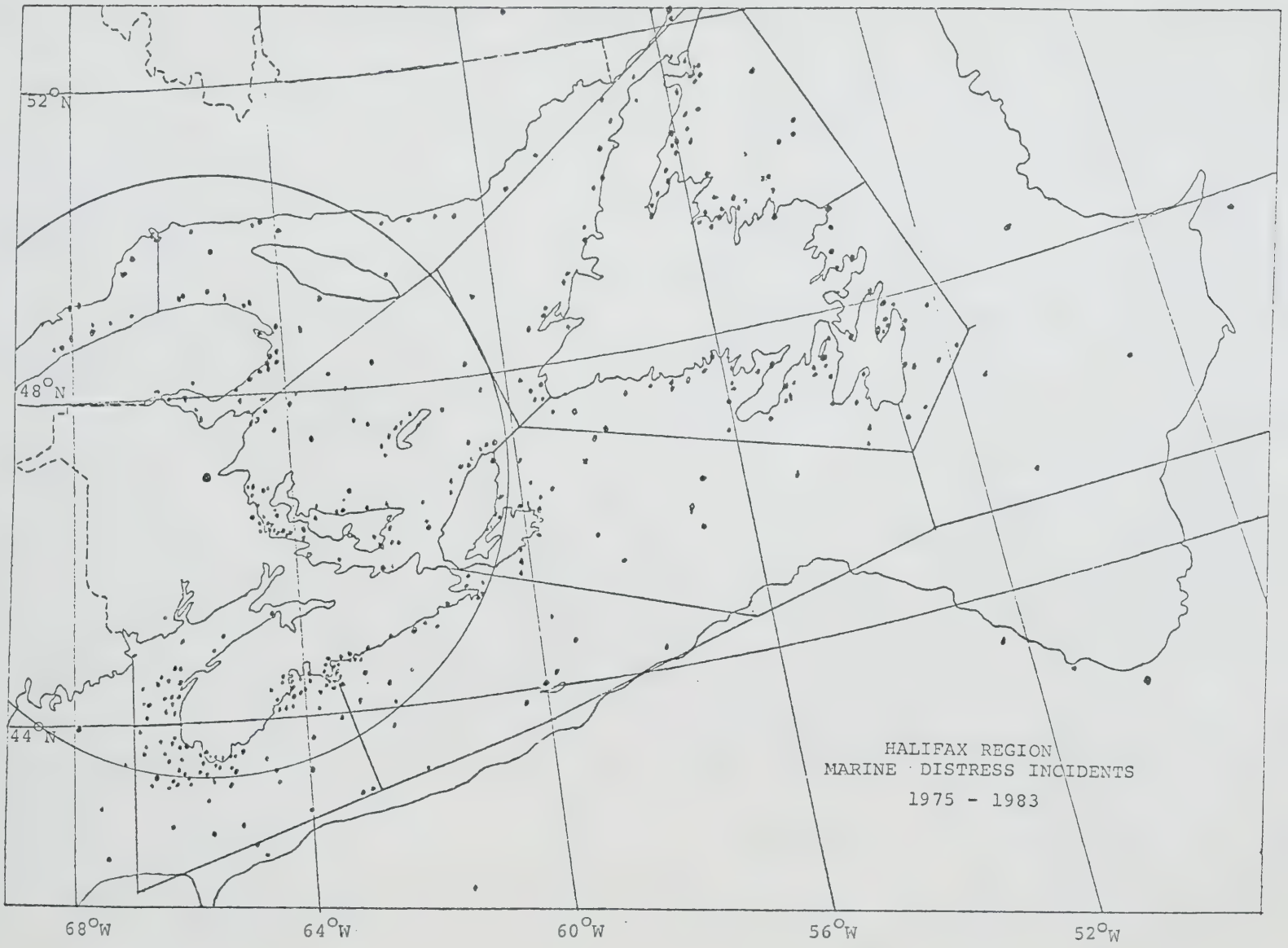
SARCUP RADIUS OF ACTION - SUMMERSIDE

Figure D-10



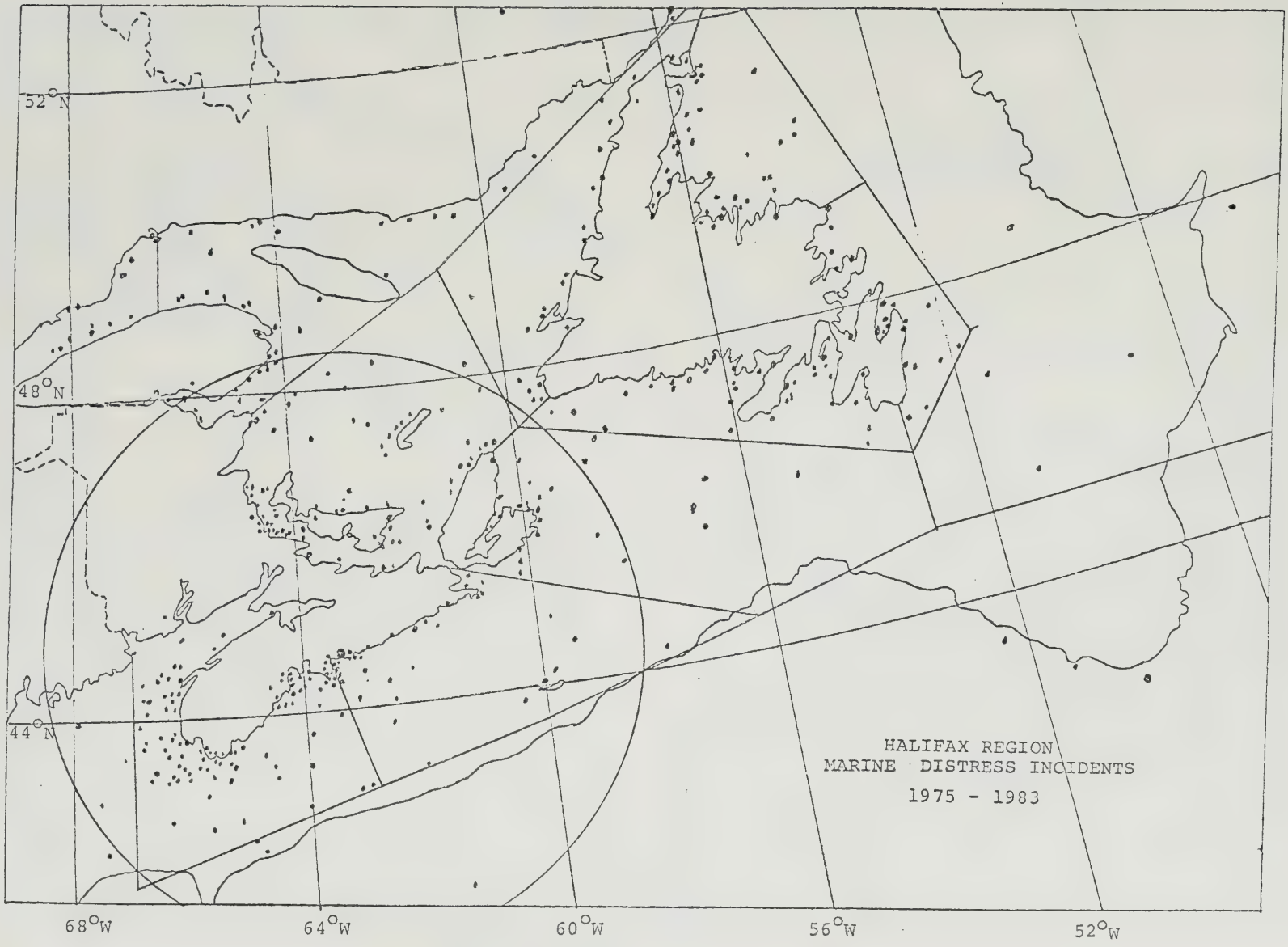
SARCUP RADIUS OF ACTION - CHATHAM

Figure D-11



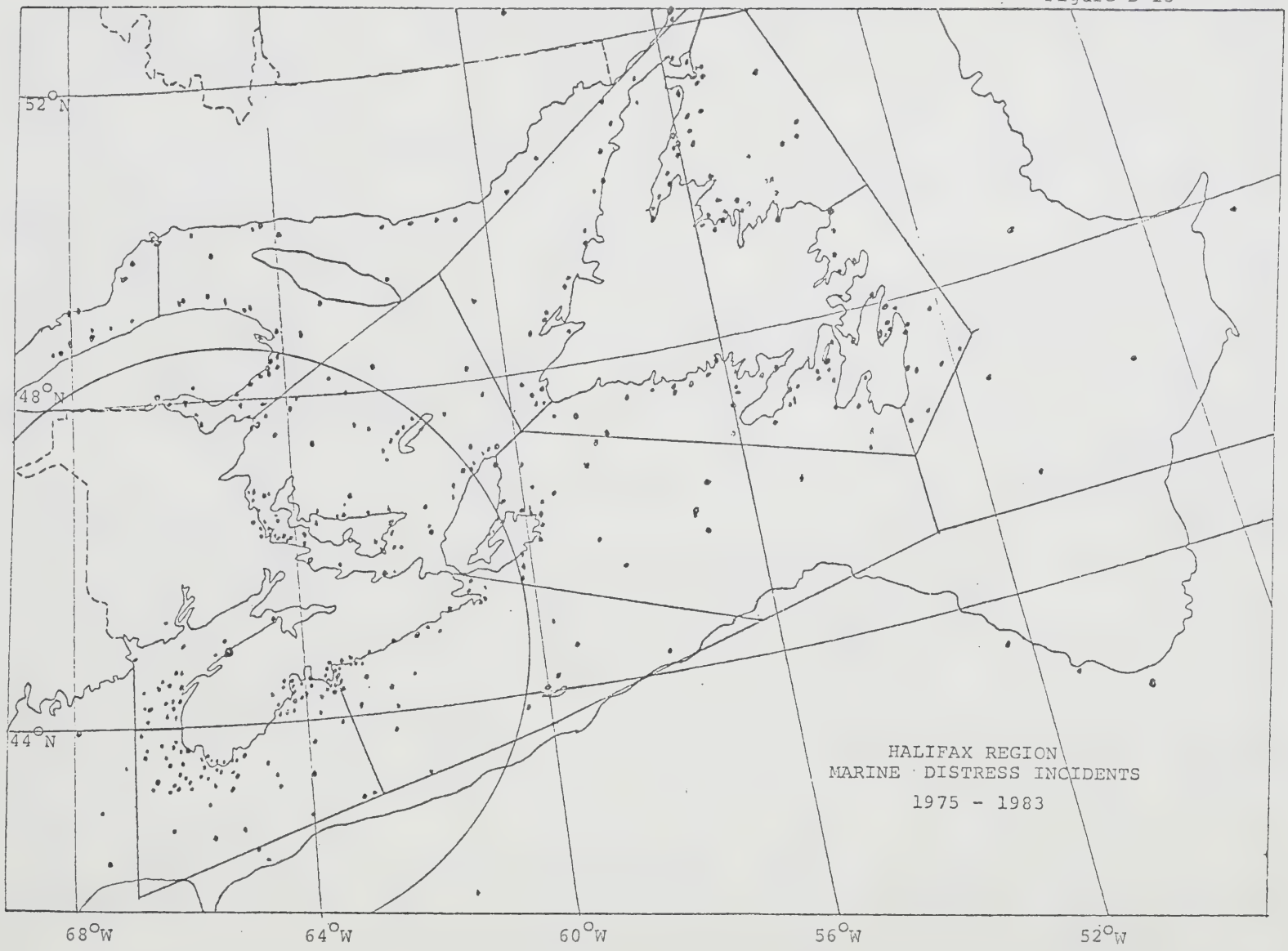
SARCUP RADIUS OF ACTION - SHEARWATER

Figure D-12



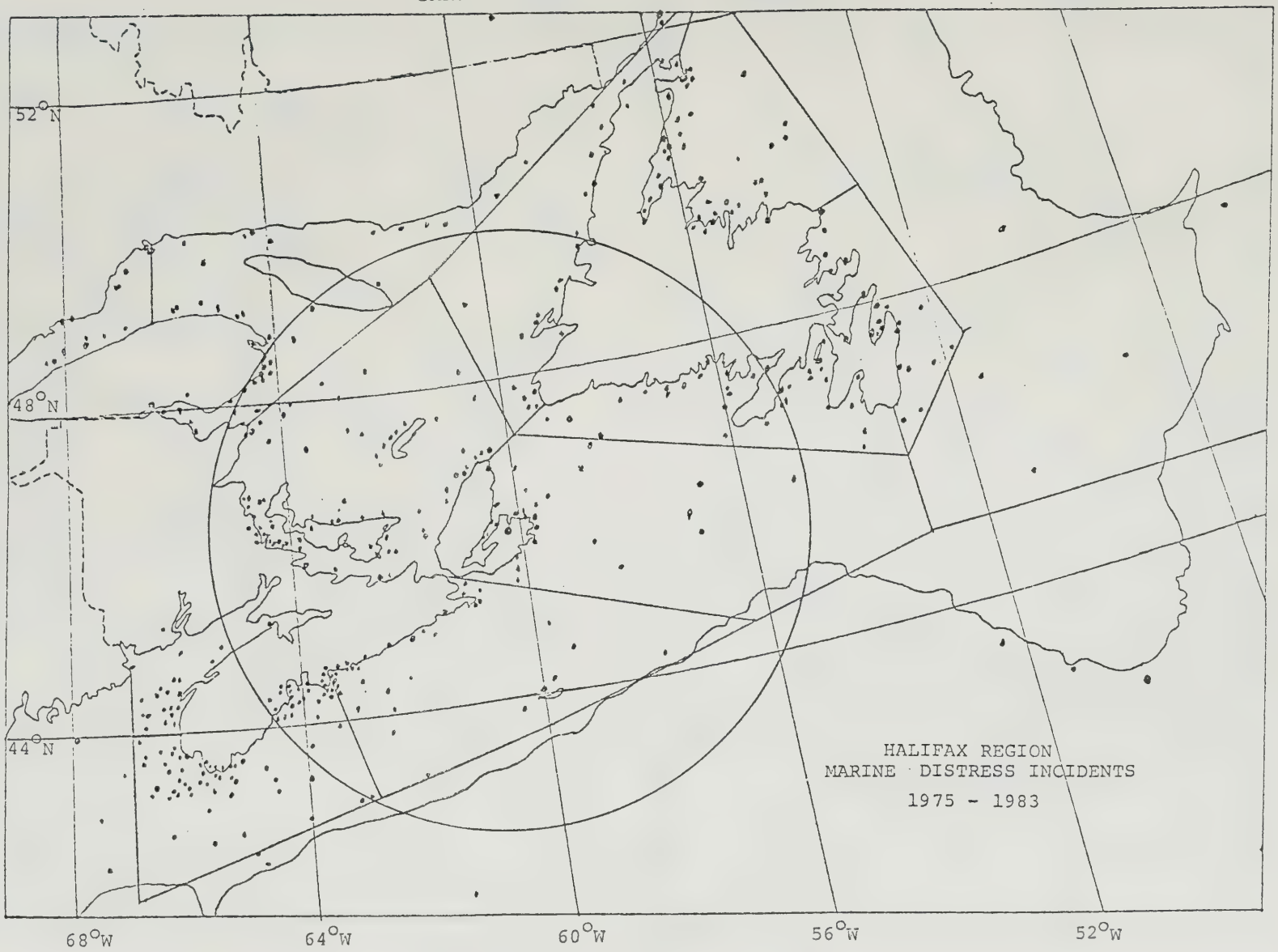
SARCUP RADIUS OF ACTION - GREENWOOD

Figure D-13



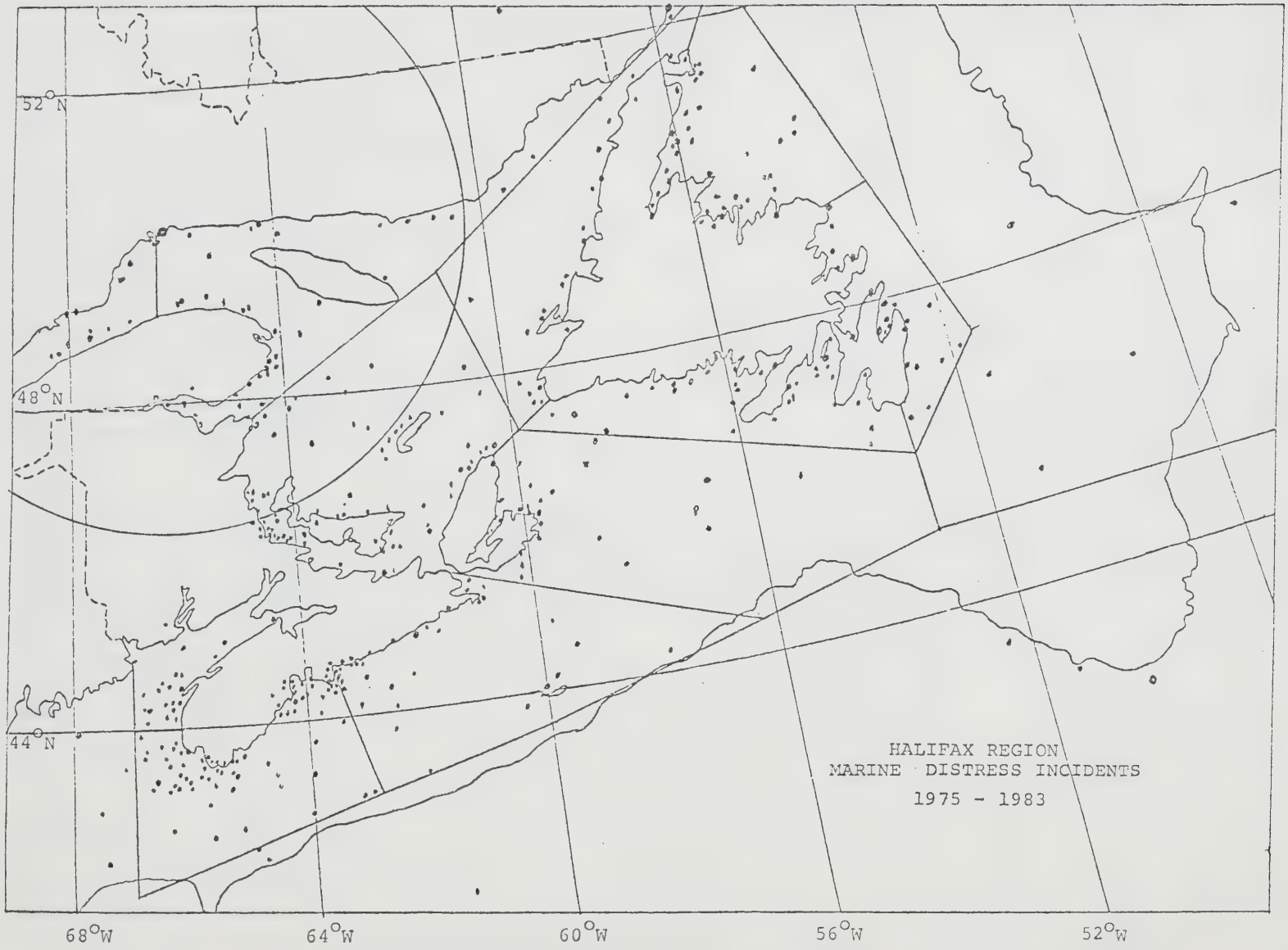
SARCUP RADIUS OF ACTION - SYDNEY

Figure D-14



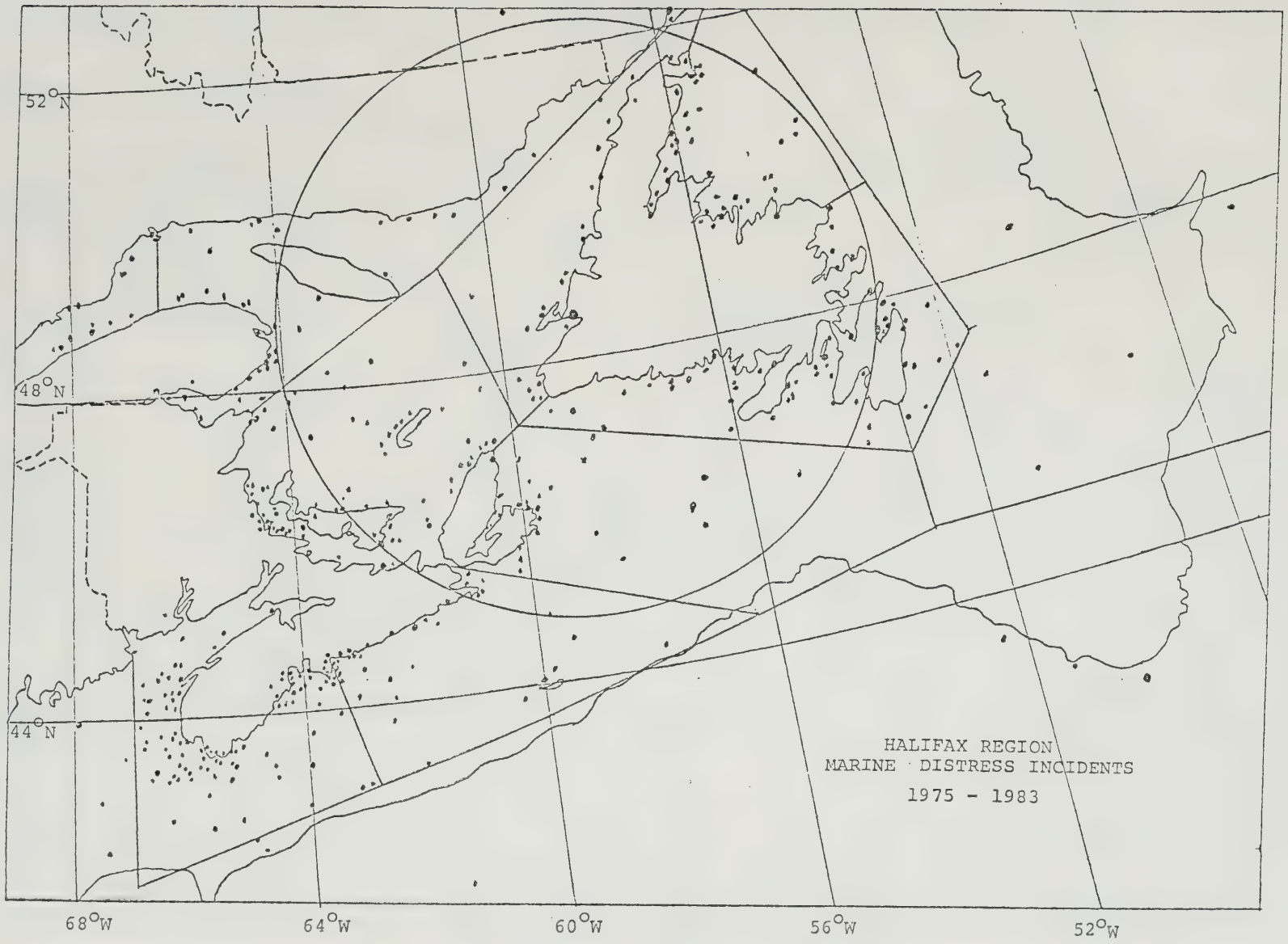
SARCUP RADIUS OF ACTION - SEVEN ISLANDS

Figure D-15



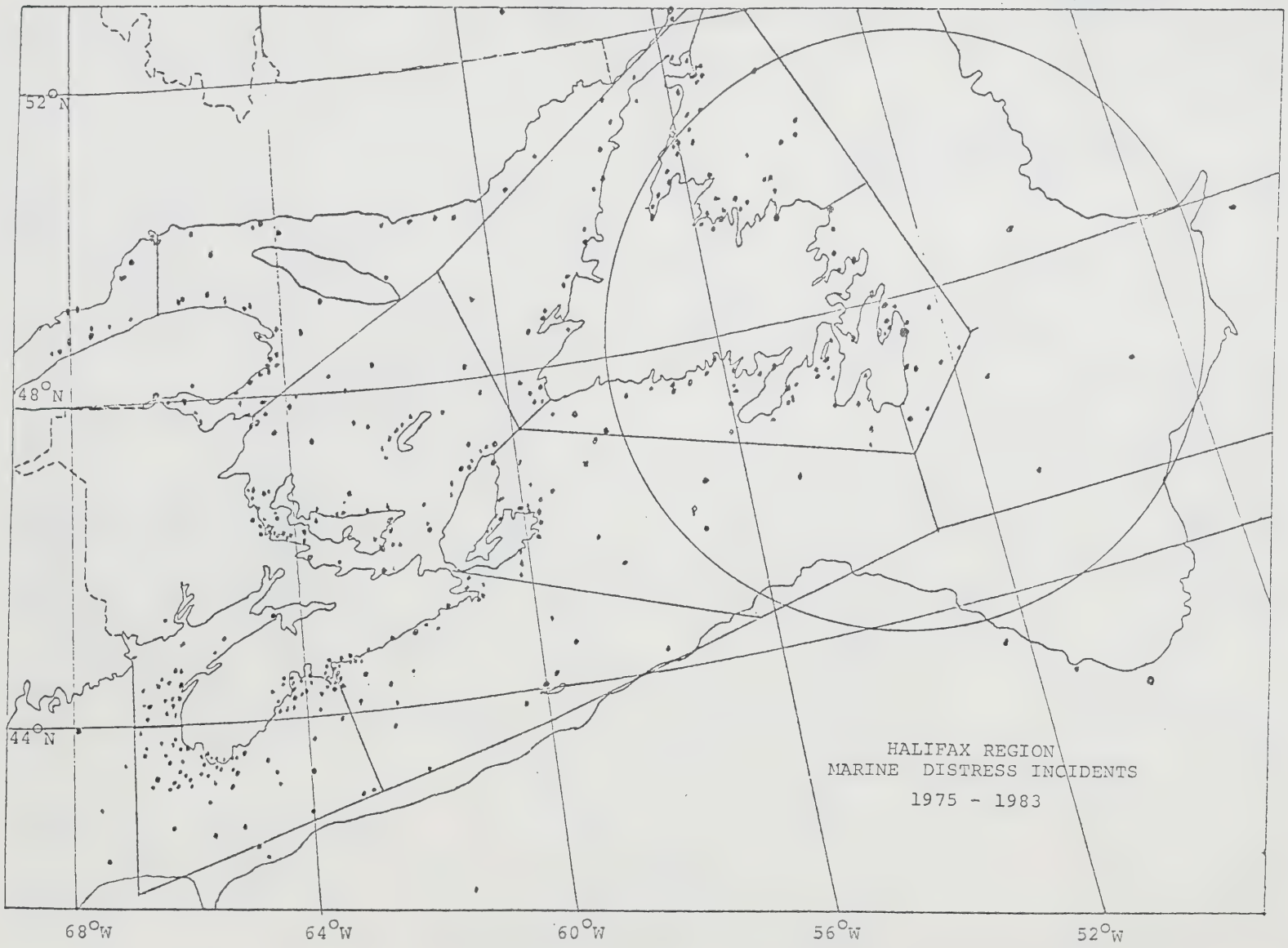
SARCUP RADIUS OF ACTION - STEPHENVILLE

Figure D-16



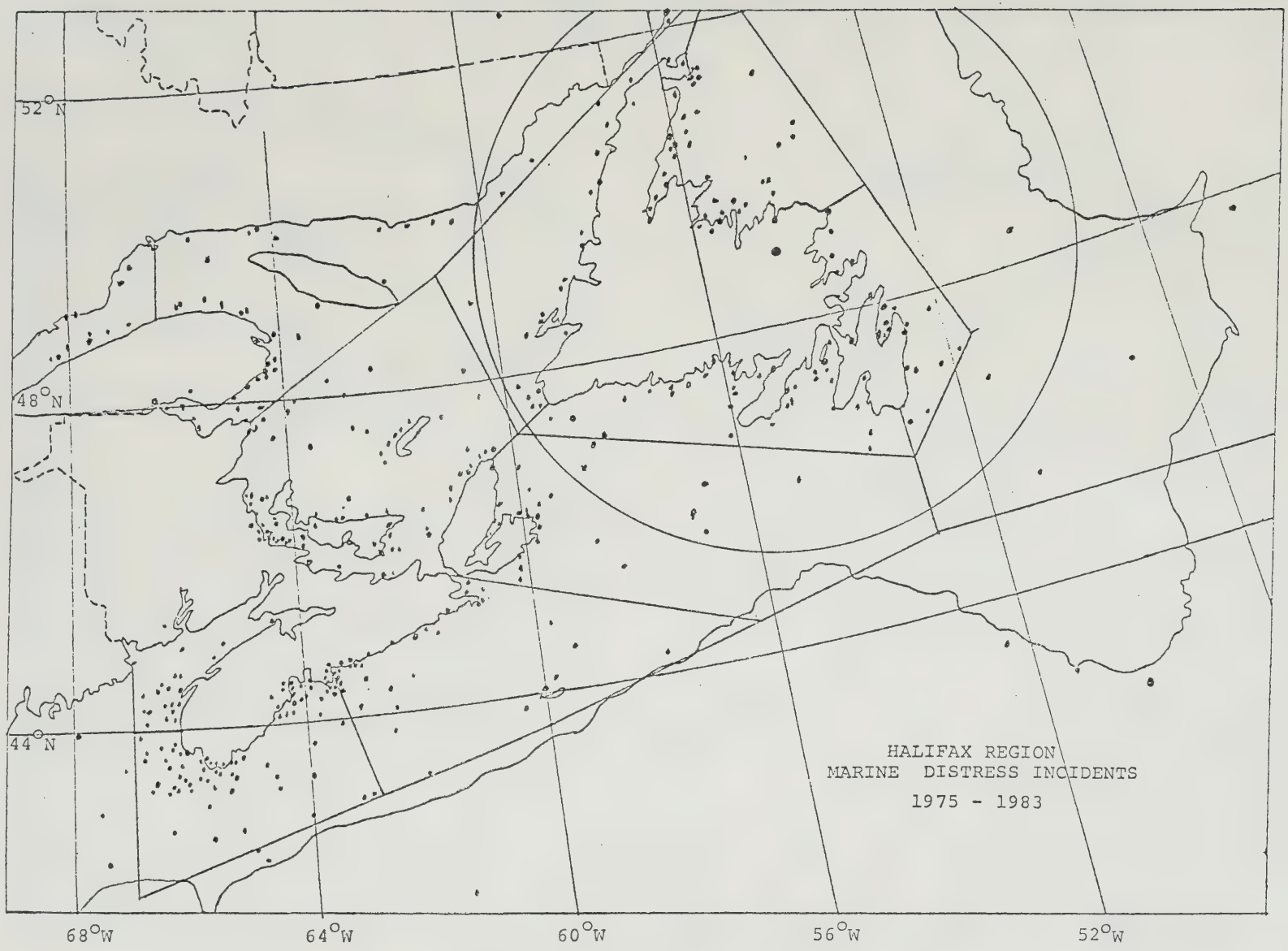
SARCUP RADIUS OF ACTION - ST. JOHN'S

Figure D-17

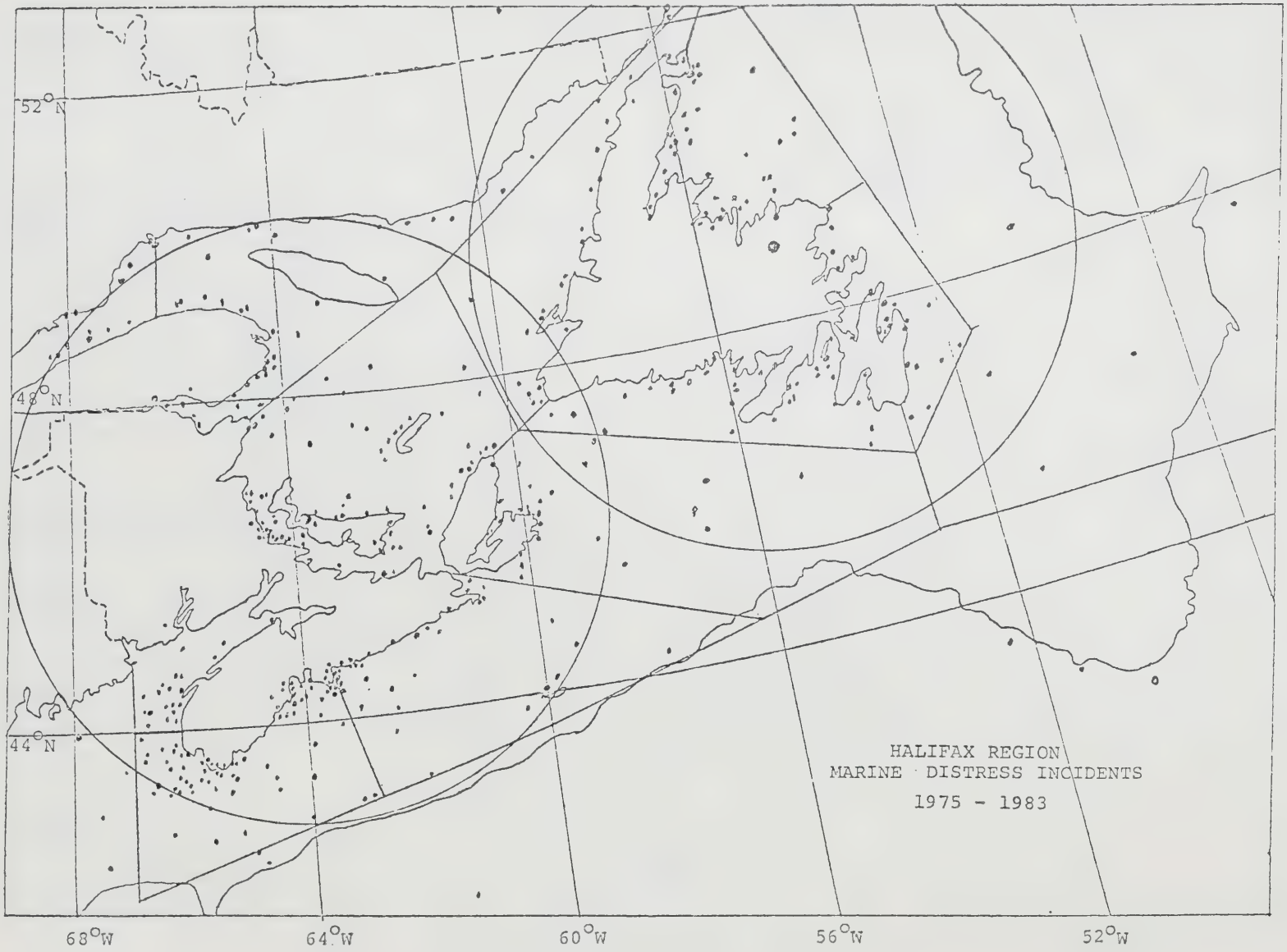


SARCUP RADIUS OF ACTION - GANDER

Figure D-18

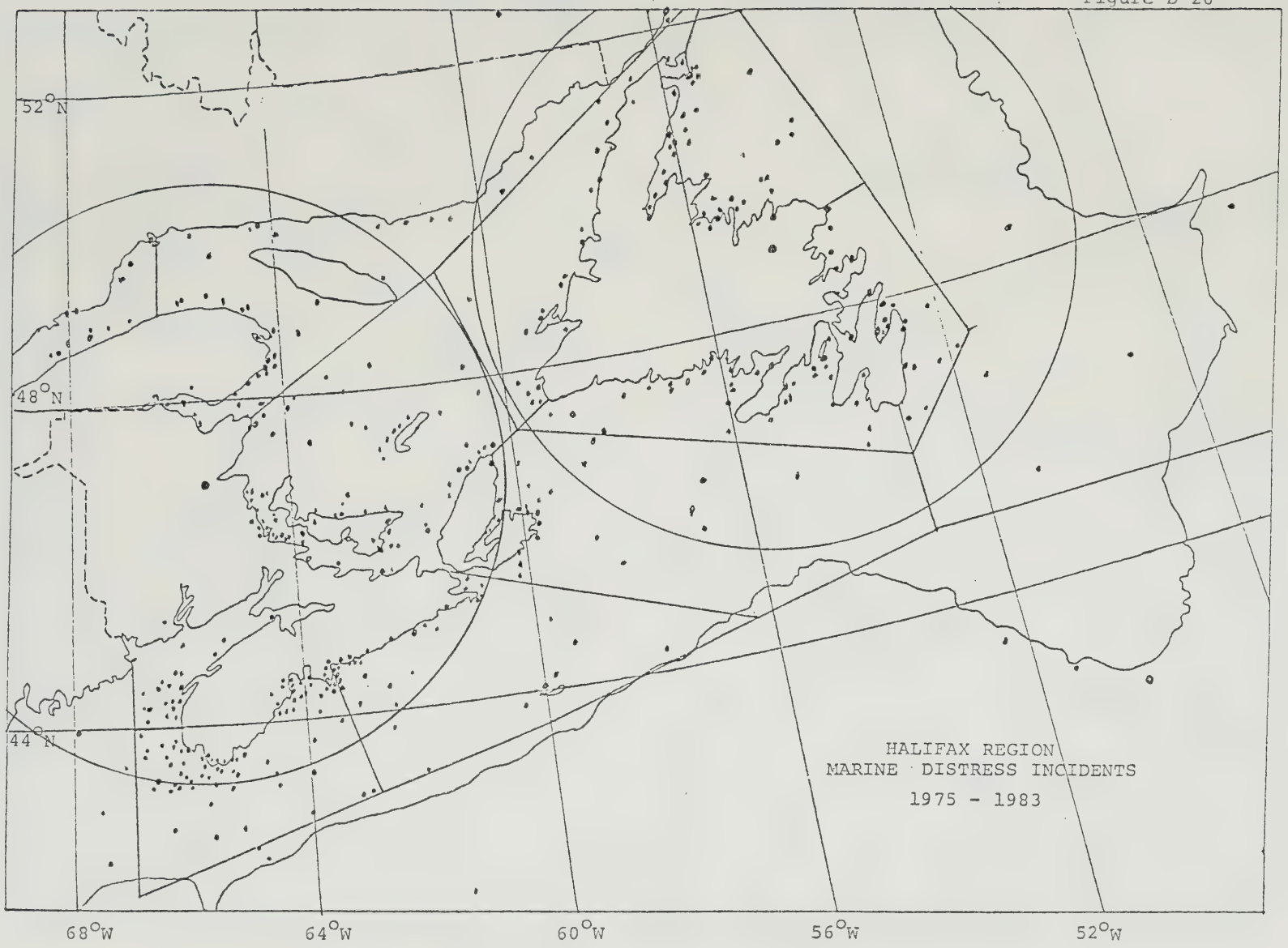


SARCUP RADIUS OF ACTION - SUMMERSIDE & GANDER Figure D-19



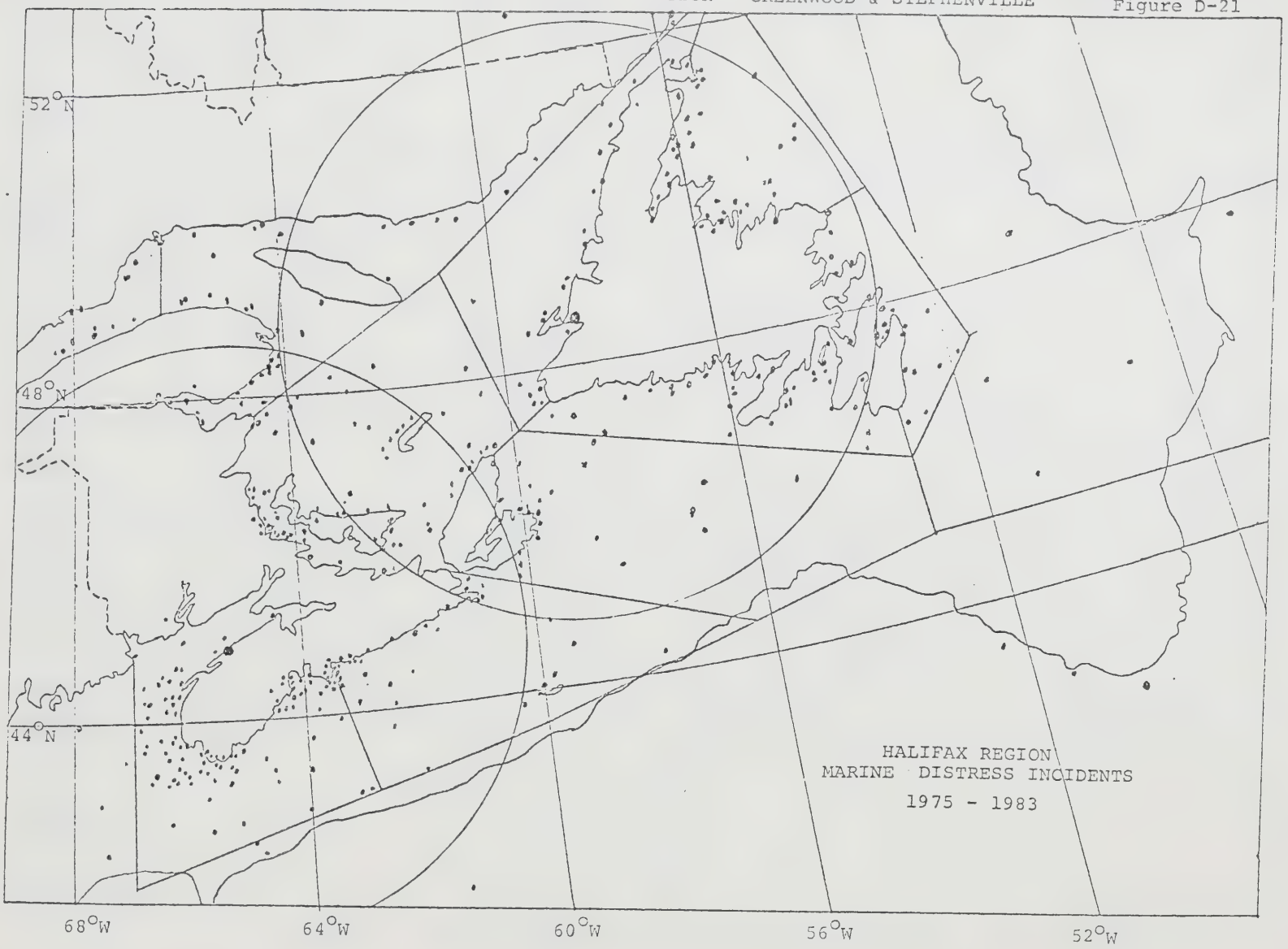
SARCUP RADIUS OF ACTION - CHATHAM & GANDER

Figure D-20

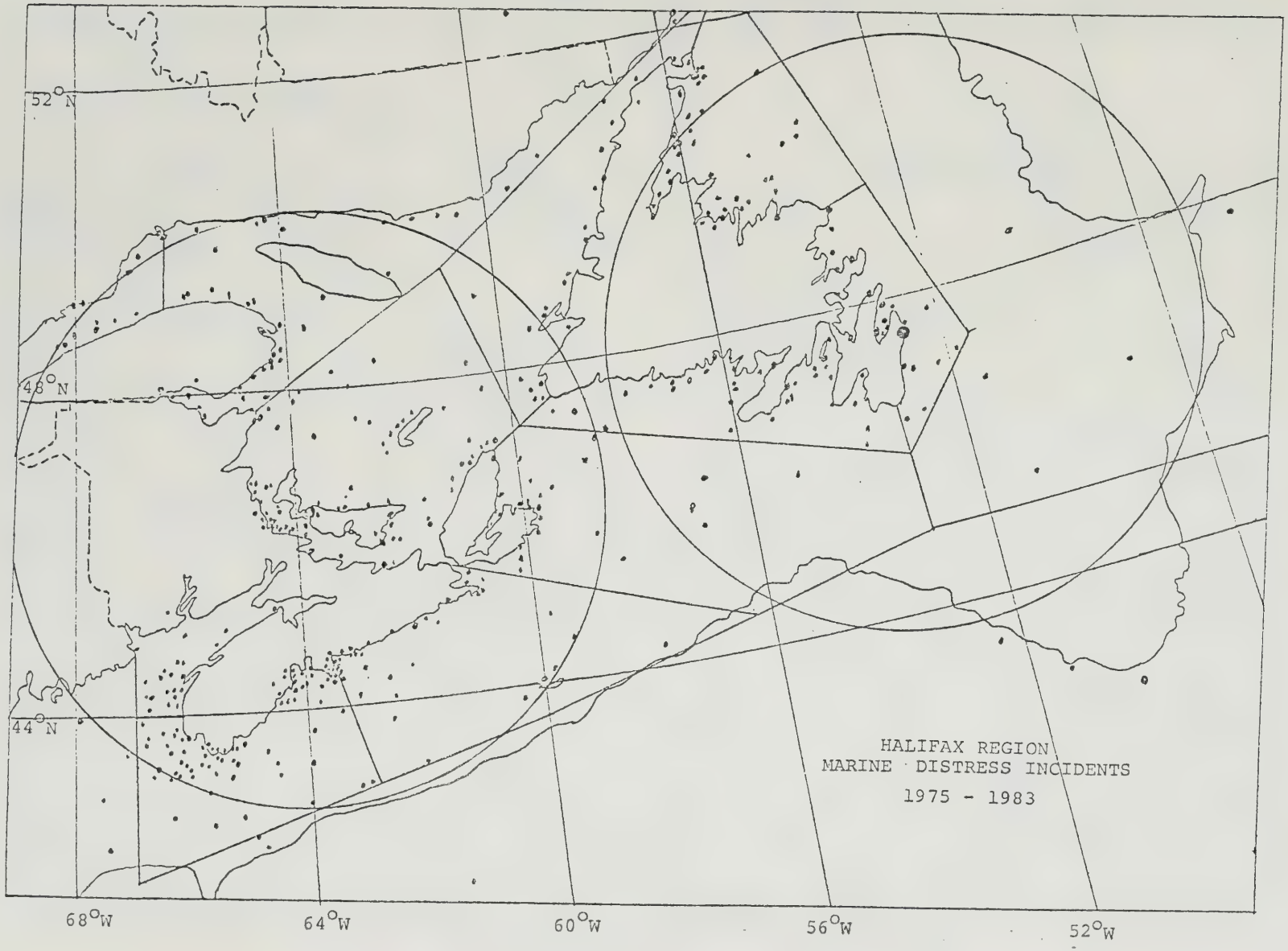


SARCUP RADIUS OF ACTION - GREENWOOD & STEPHENVILLE

Figure D-21

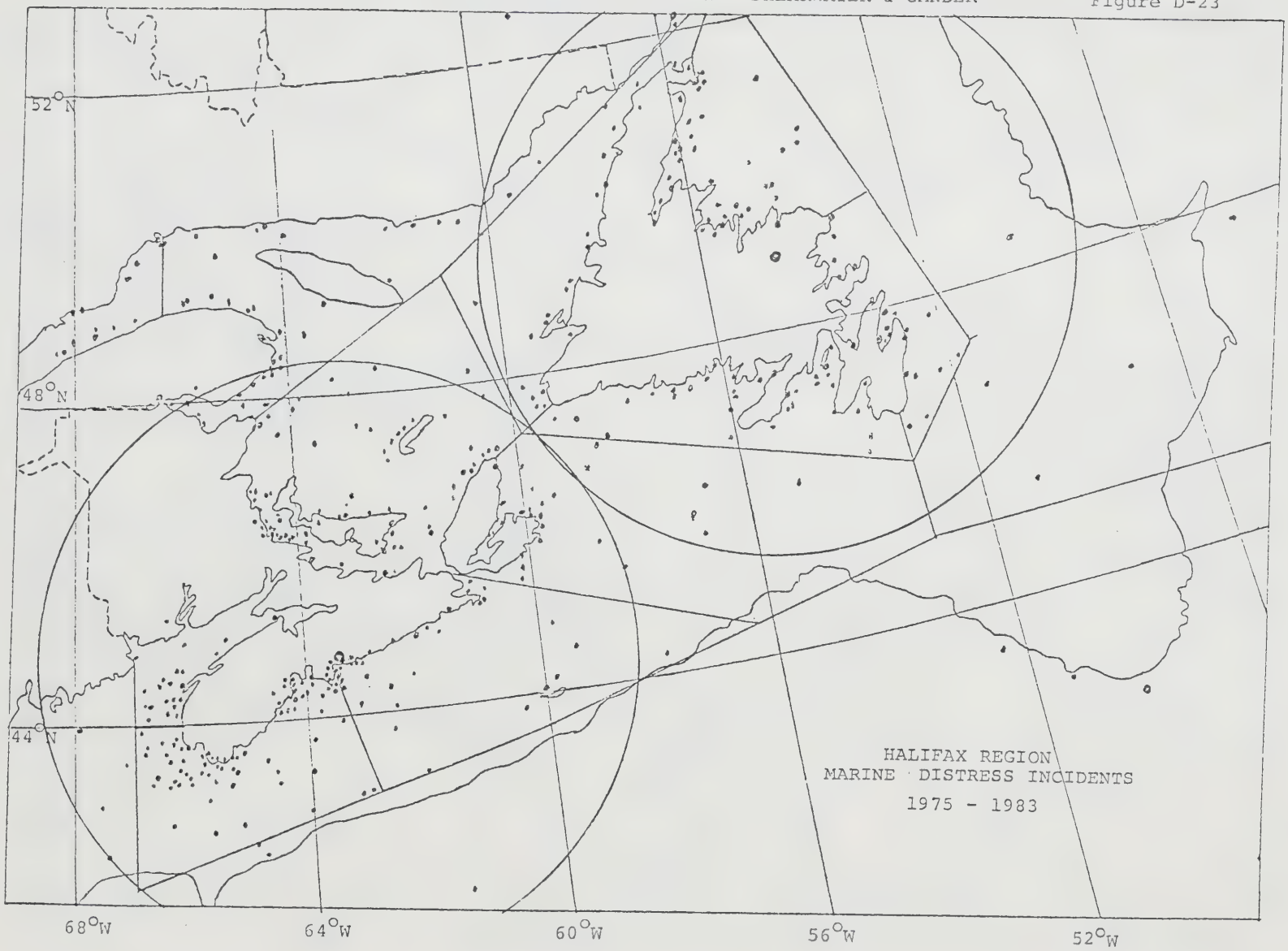


SARCUP RADIUS OF ACTION - SUMMERSIDE & ST. JOHN'S Figure D-22



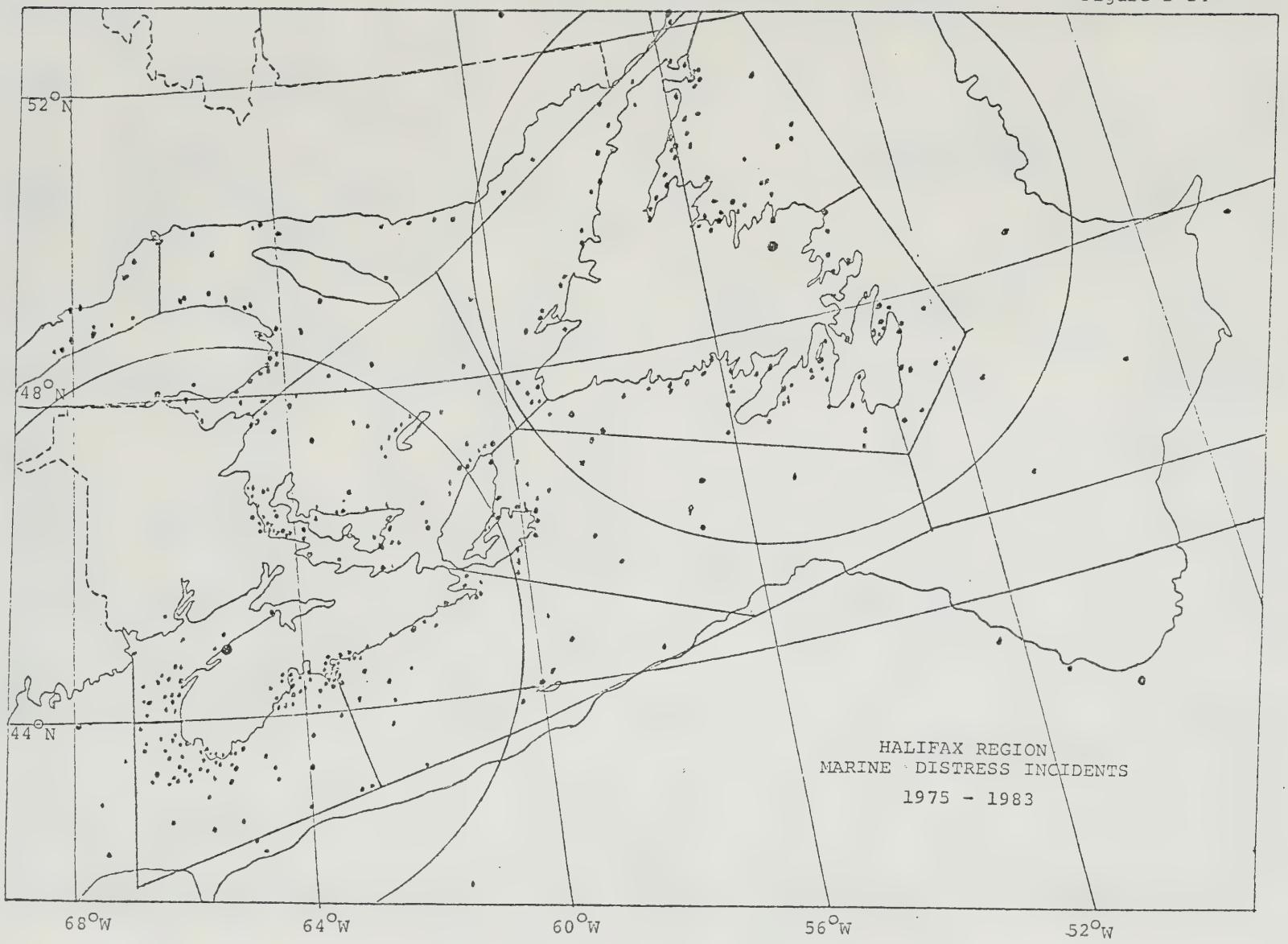
SARCUP RADIUS OF ACTION - SHEARWATER & GANDER

Figure D-23



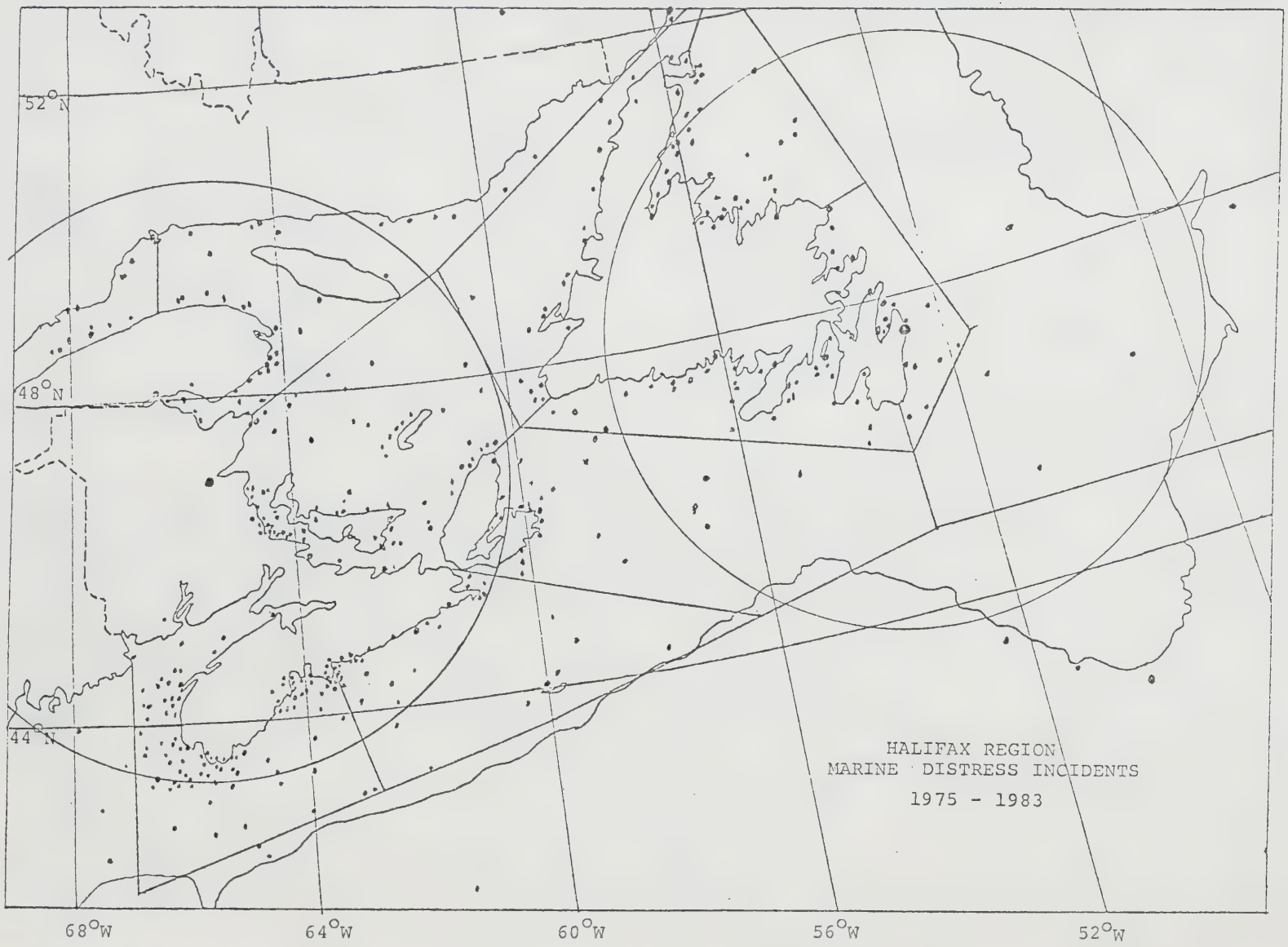
SARCUP RADIUS OF ACTION - GREENWOOD & GANDER

Figure D-24



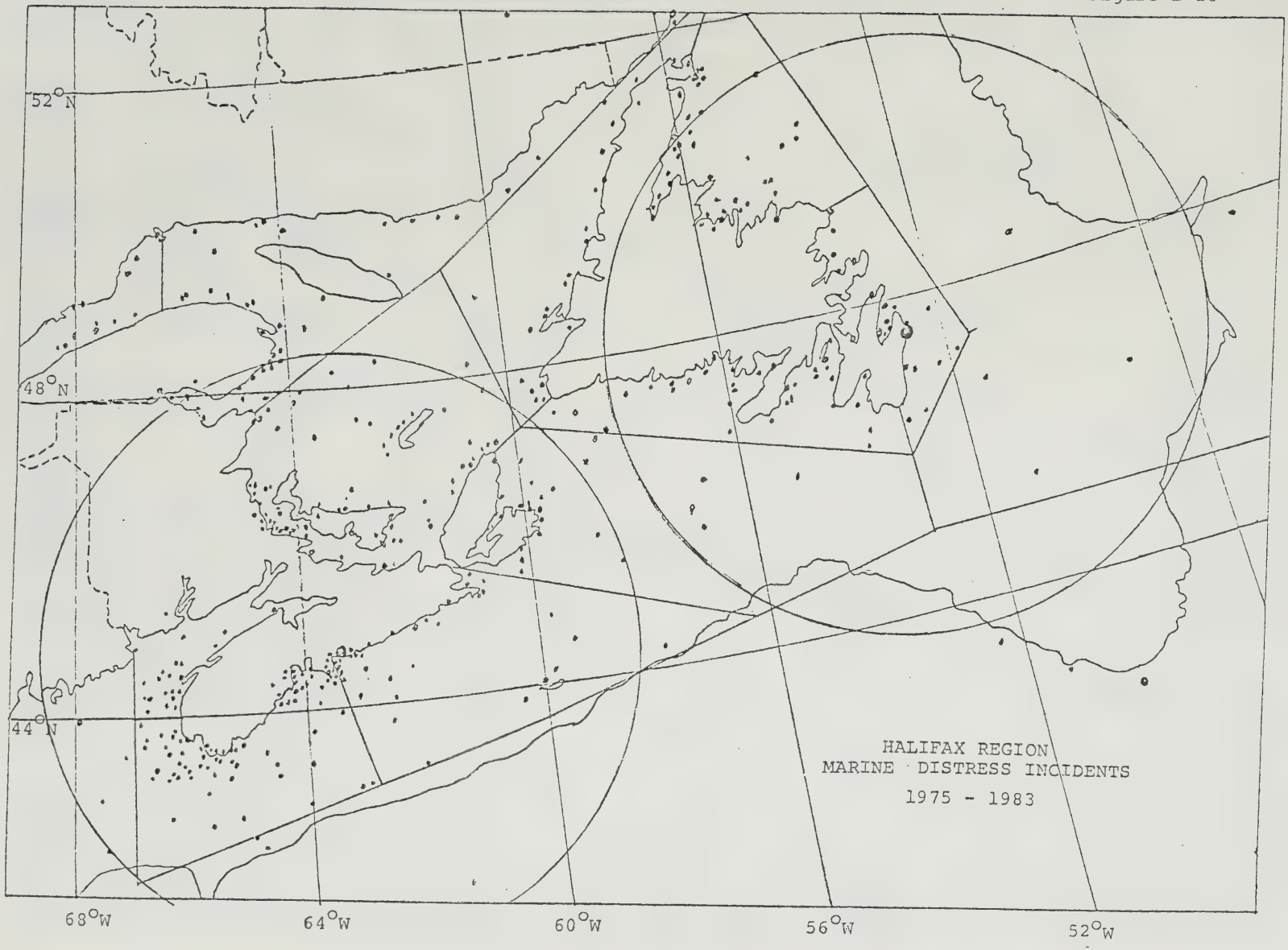
SARCUP RADIUS OF ACTION - CHATHAM & ST. JOHN'S

Figure D-25



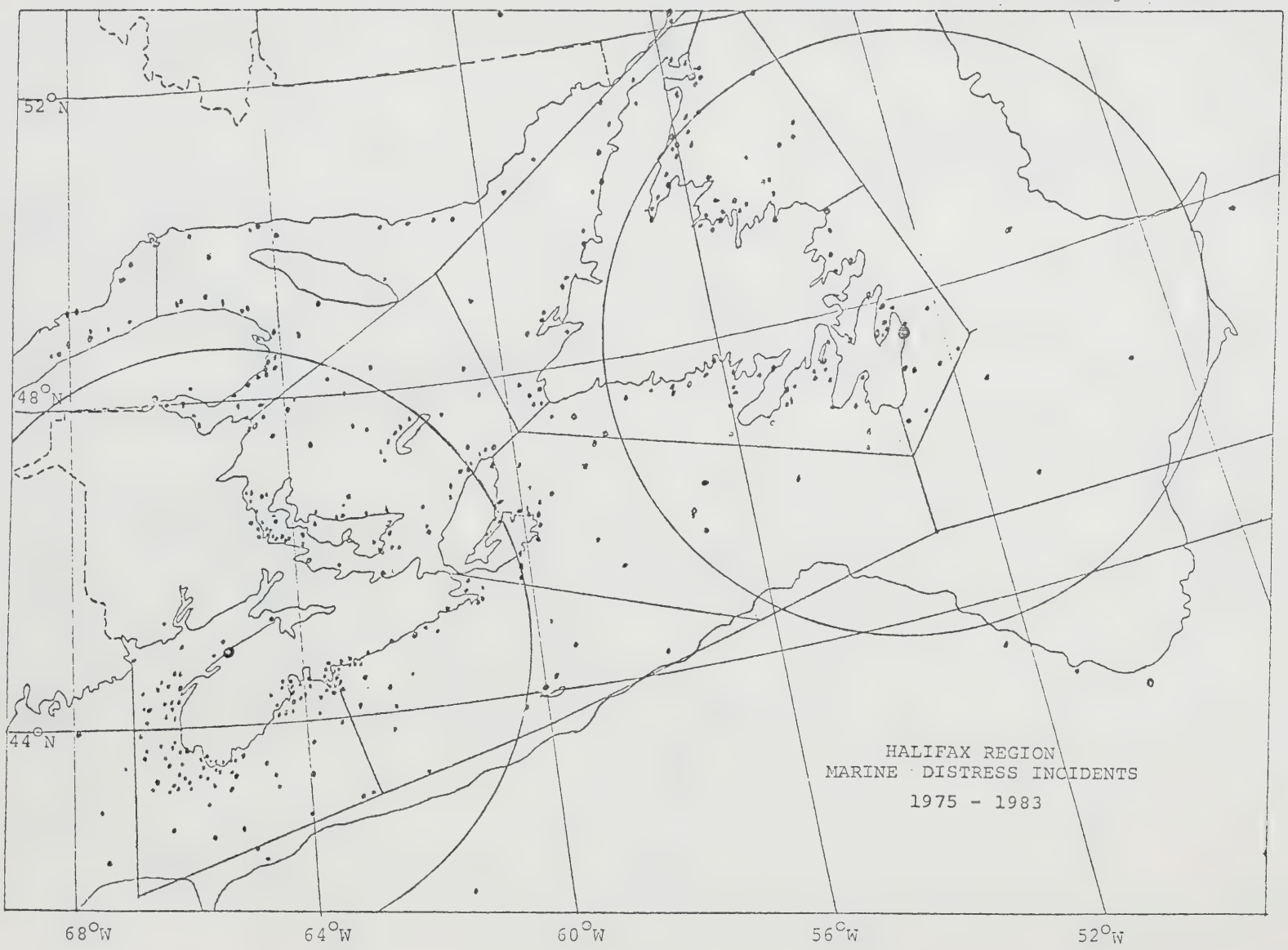
SARCUP RADIUS OF ACTION - SHEARWATER & ST. JOHN'S

Figure D-26



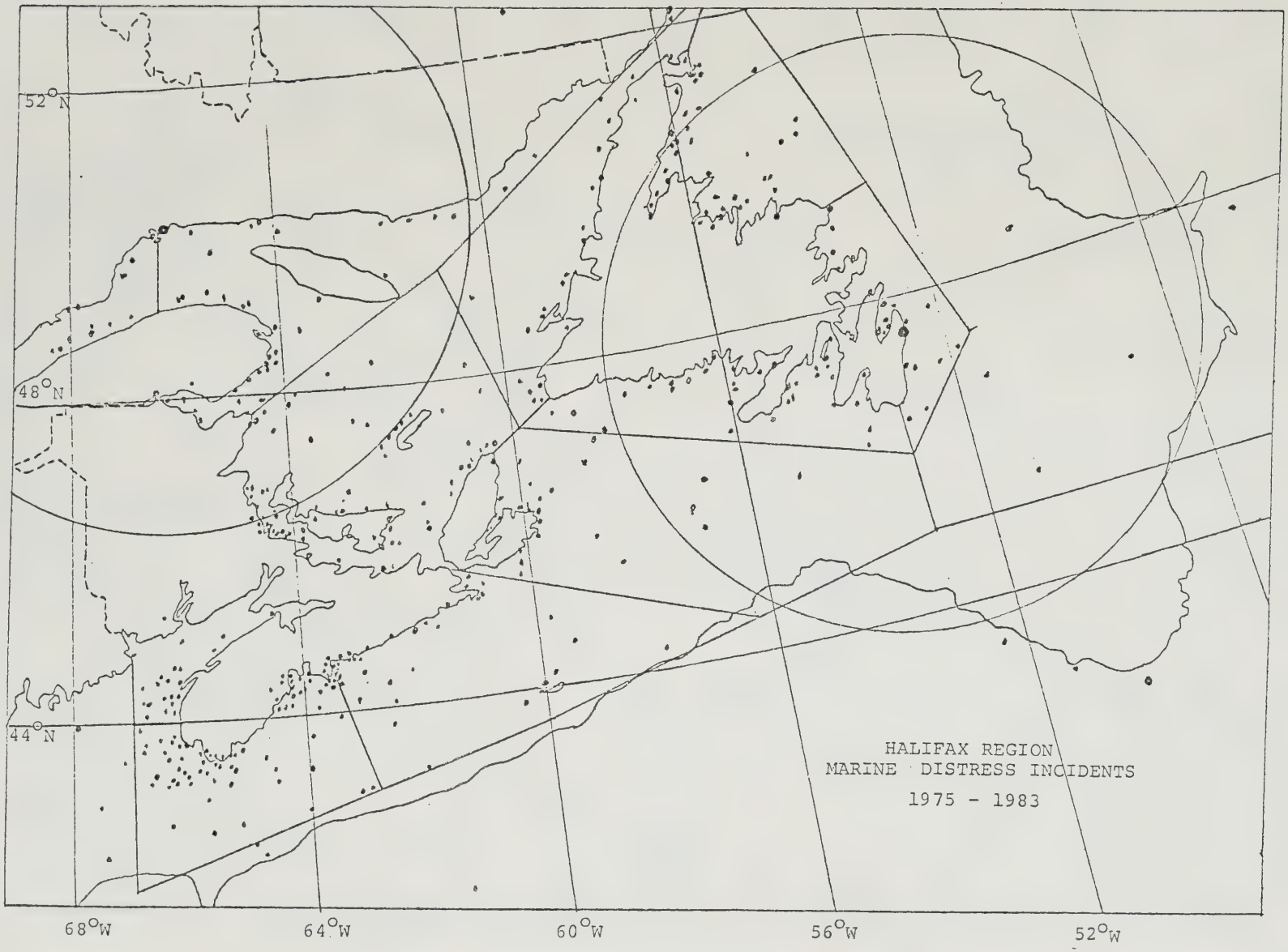
SARCUP RADIUS OF ACTION - GREENWOOD & ST. JOHN'S

Figure D-27



SARCUP RADIUS OF ACTION - SEVEN ISLANDS & ST. JOHN'S

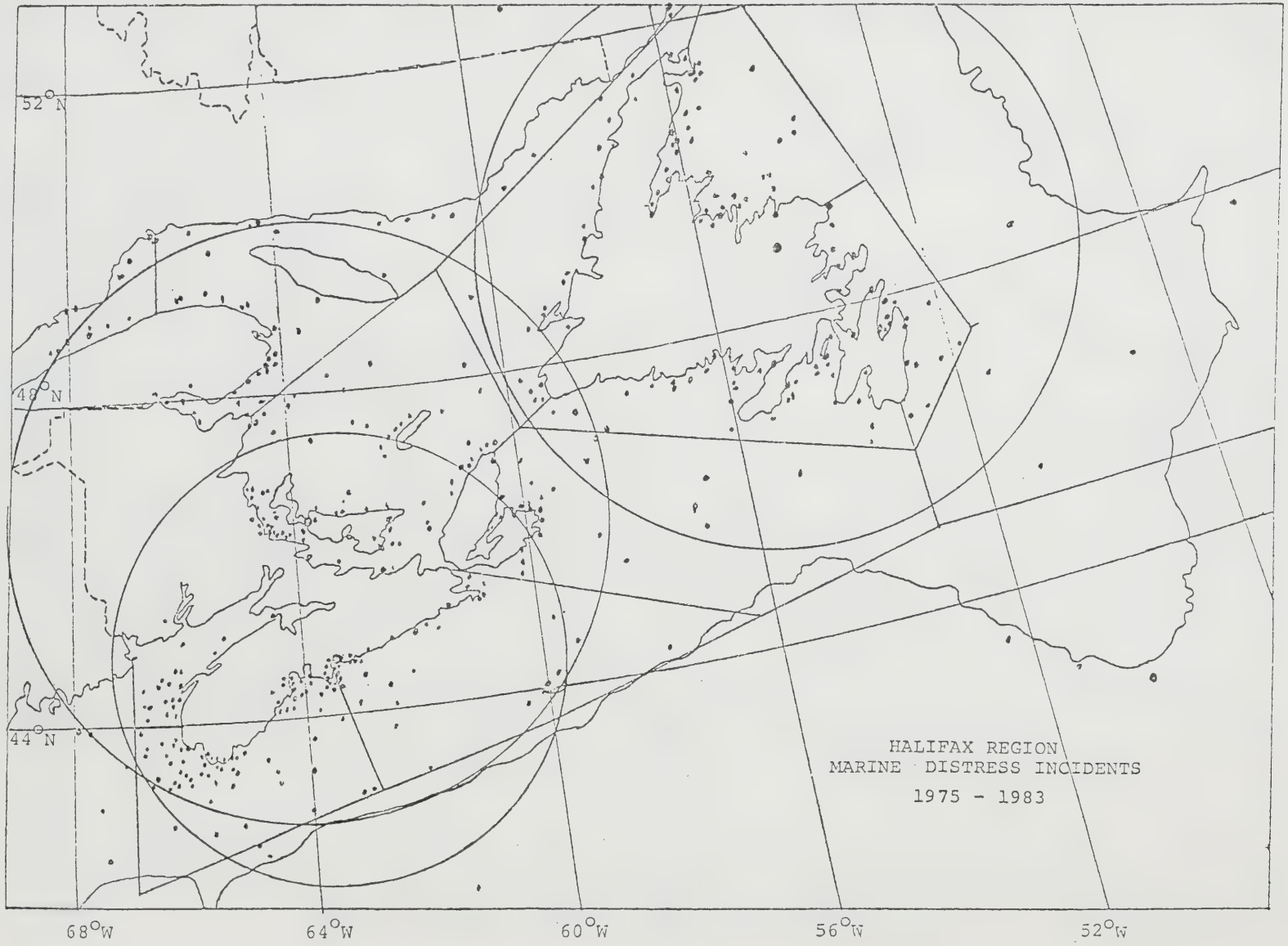
Figure D-28



SARCUP -- SUMMERSIDE AND GANDER

SEA KING -- SHEARWATER

Figure D-29



ANNEX E

STANDBY/RESCUE HELICOPTER RESCUE TIME

Figure E-1

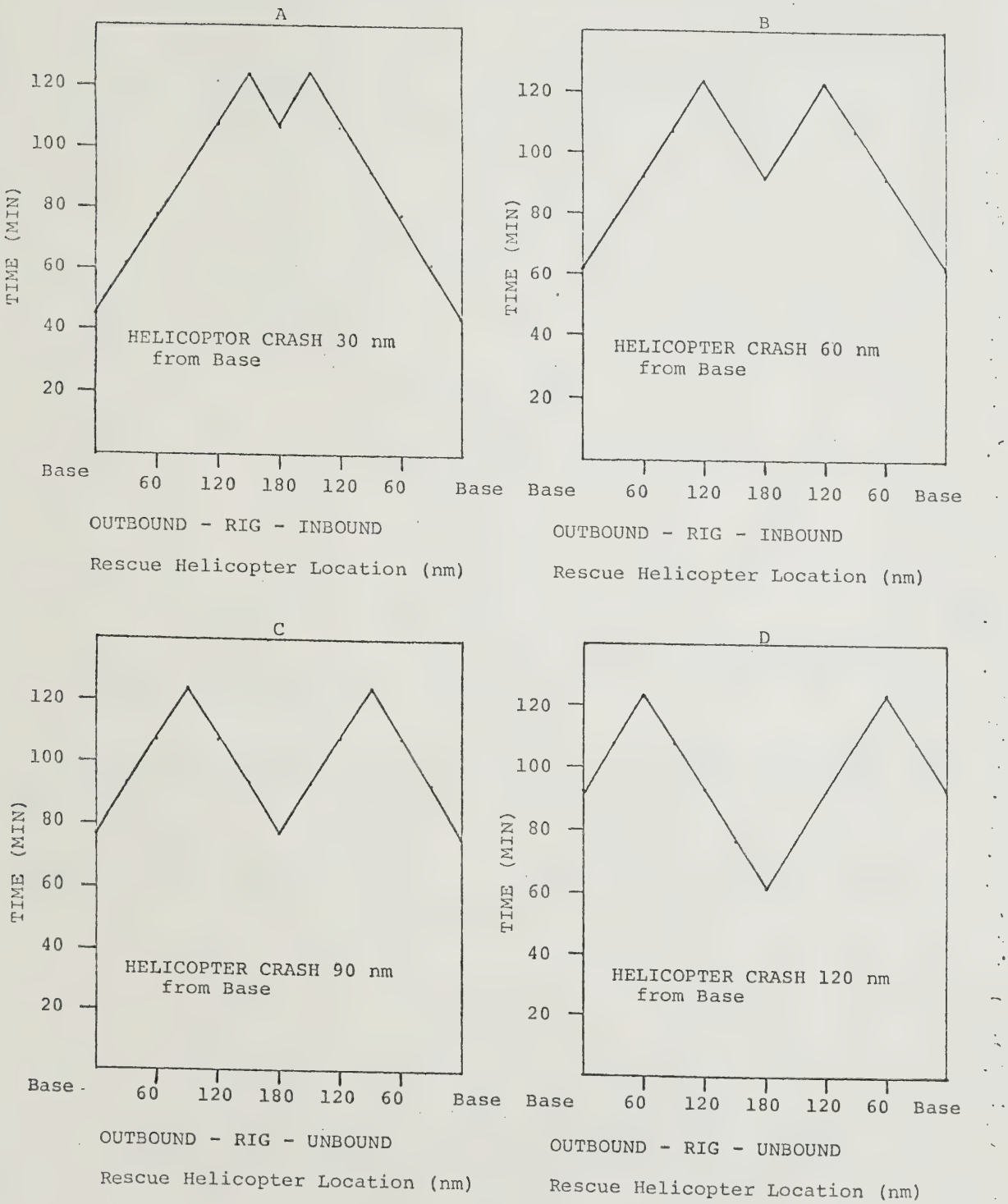
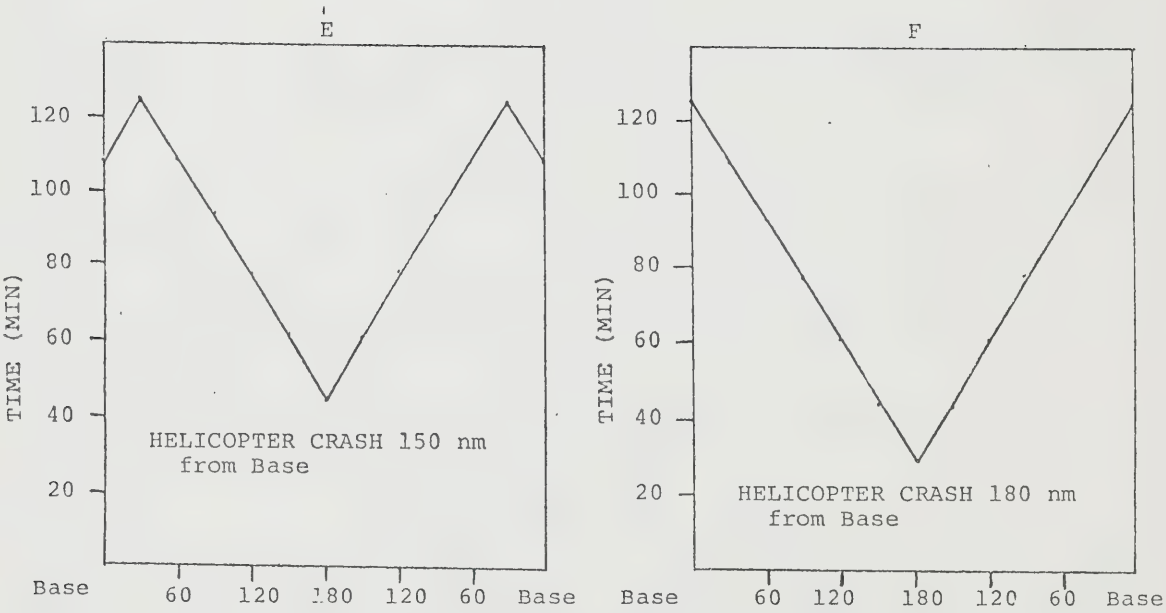


Figure E-1 (con't)



ANNEX F

A TRAINING PROGRAMME IN MARINE EMERGENCY DUTIES

Objective of the programme is to provide a standard of basic, advanced and refresher training for Canadian seamen and fishermen in lifesaving appliances, firefighting, first aid and survival functions.

Course titles are abbreviated as follows:
Emergency Duties Training for Small Vessel Crews.....MED I
Basic Emergency Duties Training.....MED II
Advanced Emergency Duties Training.....MED III

1. TRAINING OUTLINE

Course will consist of:

1.1 PART A - Lifesaving appliances, applicable to all trainees and lasting thirty hours for MED II and nine hours for MED I.

PART B - Firefighting, applicable to all trainees and lasting thirty hours for MED II and nine hours for MED I.

PART C - Rescue, and Survival, lasting twelve hours for MED II and six hours for MED I.

1.2 To some extent these Parts (A, B, and C) will be independent and, subject to the following restrictions, may be taken separately.

(a) Lifesaving module must be taken before the Rescue and Survival module and not more than 6 months may elapse between these two parts.

(b) The entire course must be completed in 12 months.

(c) The MED III course will be given as a unit but the parts may be arranged at the convenience of the college except that each practical part must be proceeded by the appropriate theoretical part.

1.3 After a date yet to be designated a further one week advanced officers course MED III will be required for applicants for certificates of competency ON 2, CN 2 and 2nd Class Engineer. This will deal with more advanced aspects of emergency situations and will provide these trainees with experience of taking charge in lifesaving and firefighting training and direction.

1.4 For revalidation of MED certificates after a period of five years from the date of issue, a refresher course will be required at a future date, until then renewal is by application.

1.5 A prerequisite for any MED course is possession of the medical certificate described in the "Medical Examination of Seafarers Regulations", or such proof of physical fitness as may be required by the education authority responsible for conducting the course.

2. LIFEBOATMAN AND MARINE EMERGENCY DUTIES REGULATIONS

2.1 The certification of Lifeboatmen Regulations C.R.C. 1412 now governs the issue of Lifeboatmen and MED certificates.

2.2 Basically there are 3 certificates now available:

a) Lifeboatmen with restrictions;

b) Lifeboatmen unrestricted;

c) Marine Emergency Duties.

2.3 MED II or part thereof is required for 2 b) and c). The only part of MED I acceptable for these certificates is part D, S.O.F.A.

2.4 The restricted lifeboatman certificate is intended for those who have not attended an approved training course in lifesaving appliances but who have served aboard ship for at least one month.

2.5 The unrestricted lifeboatman certificate is intended for those who have completed the full Part A of the MED II course which covers all types of lifesaving appliances, and the certificate issued does not restrict the types of equipment on which the certificate is valid.

2.6 The MED certificate is intended for those who have completed all parts of the MED II training course. The subsequent examination covers all these subjects and the MED certificate carries with it all the rights of an unrestricted lifeboatman's certificate.

2.7 It is not intended at this stage that a formal practical examination as such will be given to students taking any parts of the training in full. MED II trainees will be required to write a multiple choice examination at a time convenient to the college and the examination centre on completion of the Parts. In lieu of the practical examination, it is agreed that examiners have access to all training classes in operation and upon reasonable notice. This waiving of the practical examination only applies to trainees undertaking the Part in full. It does not apply, for example, to courses for a restricted LB certificate, which are laid on by the colleges or other bodies from time to time, held entirely on board one ship using only that ship's equipment.

2.8 Books of Multiple Choice questions are for use in the examinations. The booklets are laid out as follows:

PART A Lifesaving Appliances

PART B Firefighting

PART C Survival

Initially there will be 40 questions in Part A, 20 questions in Part B and 10 questions in Part C. There are no failing questions; answer keys will be provided by Ottawa. The pass percentage is 60% so the pass mark for Part A taken as a whole by MED and LB (full) applicants is 24, for Part B taken by MED applicants is 12, and for Part C taken by MED applicants is 6.

2.9 The examination booklets will be answered on the Public Service Commission standard answer forms PSC 1953 (2-79). Since these completed answers are subject to periodic analysis using optical scanning equipment, a standard approach must be maintained. The trainee must write his name, the code name of the paper, for example (MED II 3A) and date on the left hand side of the form. The score should be entered on the space provided. A separate answer form must be used for each part to the MED examination.

2.10 As indicated in the previous paragraphs, the examination and thus the Parts and sections to be written will depend upon the certificate required.

(a) An applicant for a MED certificate will write all parts and sections, these may of course be taken separately.

(b) An applicant for an unrestricted LB certificate will write all sections of Part A.

(c) An applicant for a restricted LB certificate will write those sections of Part A appropriate to the equipment on the ship which he served and was trained.

2.11 The college will assess the practical part of a man's training as passing or failing and only those who are graded as passing will write the multiple choice booklets. Those who are graded as failing the practical training will have to repeat the course before being permitted to write the booklet. Schools will send completed answer forms to the booklets to the local examination centre on completion of marking and centres should send them to Ottawa. Local examination centres have been given the responsibility of nominating, to schools in their areas, the booklet which is to be used for such an examination.

2.12 Applicants who fail the multiple choice booklet written at the school on completion of their practical training will be permitted, having already been graded as passing the practical part, to write again within 12 months without repeating the course, but all subsequent examinations shall be taken at an examination centre. Where an applicant passes such a subsequent examination at a centre, the school where he trained should be informed, they will then issue the applicant an EXN 24 covering that Part of the MED course.

2.13 Where at a school a candidate comes to take the multiple choice examination and is found to be illiterate, the examination may be taken at the schools discretion as an oral examination and a letter to that effect sent to the Department of Transport, Ottawa.

MED I

3. CONDITIONS FOR APPROVAL OF COURSE

3.1 The MED I instructor shall have skills and/or qualifications related to the Marine industry, will usually hold a certificate not lower than Fishing Master Class III or fishing watchkeeping engineer and hold a valid Marine Emergency Duties Certificate. Whenever the course instructor gives the S.O.F.A. Course, he will be qualified by St. John's Ambulance Society to lecture and examine.

3.2 A small hand portable boat or dory (a larger boat may be substituted up to 25 persons capacity).

3.3 A four-man liferaft (a larger raft may be substituted up to 12 men).

3.4 Twelve approved lifejackets.

3.5 Thirteen firemen's suits, boots and gloves.

3.6 Twelve water pressure and twelve chemical extinguishers.

3.7 Four CO_2 extinguishers.

3.8 Sufficient 1½ bore hoses, branches, fog and jet nozzles.

3.9 Steel trays for containing fires.

3.10 Safety cans for fuel.

3.11 Two safety lamps.

3.12 The number of students participating in the practical exercises shall not normally exceed twelve, as this is the maximum number which can safely be supervised by one instructor.

3.13 The number of students in the first aid part will not normally exceed 12.

3.14 The number of students in the film and lecture parts will not normally exceed 24.

MED II

4. CONDITIONS FOR APPROVAL OF COURSE

4.1 Minimum qualifications for a director or chief instructor are 1st Mate H.T. or 2nd class engineer, he will also hold a valid MED certificate and will have completed an approved MED III course. However, other qualifications may be accepted on the merits of individual cases.

4.2 Two sets of boat davits and one raft davit, together with their associated gear and preferably with means to simulate a 15° list; some variation from these arrangements may also be considered.

4.3 A standard ship's lifeboat with access to open water for exercises afloat when weather and ice conditions permit.

4.4 An inflatable liferaft together with sufficient life jackets and lifebuoys.

4.5 A swimming pool or access to one where trainees can participate in the practical use of lifejackets, lifebuoys and the inflatable liferafts.

4.6 A standard line throwing apparatus together with a breeches buoy; means to be provided to simulate rescue by breeches buoy from a vessel aground; (Small fire service line throwing can be used instead of a standard line throwing gun if circumstances warrant it).

4.7 A flat area clear of obstructions for exercises involving helicopter rescue.

4.8 Sufficient normal and basket type stretchers for use in rescue and first aid exercises.

4.9 A two-storey steel ship's mock-up having a rectangular shape approximately 15' x 30', it may be of advantage to have the unit constructed of steel panels bolted on to angle frames for the easy maintenance and replacement of plates; the ground storey to be subdivided with two alternate routes to each compartment; doors to be of marine type with a raised sill. A two-storied structure is necessary to teach trainees the use of escape ladders and hatchways; the vital element in use of these mock-ups is the trainees exposure to fire simulated as realistically as possible.

4.10 Adjacent to the mock-up structure should be a fire box; essentially a brick walled box 12' long x 7' high x 5' wide with an open top and front divided into compartments in which the three types of fires can be lit and extinguished by the trainees. Alternatively steel trays approximately 6' x 3' x 12" high with a raised steel back plate which can be used for the same purpose.

4.11 A steel or concrete open pit approximately 8' x 8' x 12" for simulating large oil fires.

4.12 A steel cross-shaped structure with arms 10' long and 21" wide and 12" deep fitted with two steel baffles in each arm set in the ground so that oil bilge fires can be realistically simulated.

4.13 Sufficient range of fire extinguishers together with spares to ensure trainees have adequate experience in extinguishing each type of fire.

4.14 Sufficient hoses with smooth bore, spray and Rockwell nozzles.

4.15 Sufficient sets of self-contained breathing apparatus.

4.16 Adjacent to the site, a building with facilities for a classroom, showers, changing room and storage for items or equipment.

4.17 Fourteen firemen's suits, boots and gloves.

4.18 The number of students in the firefighting course shall be limited to twelve as this is the maximum number which can be handled safely by two instructors. During practical fire-fighting exercises, the instructors should for reasons of safety be distinguishable for the trainees.

MED III

5. CONDITIONS FOR APPROVAL OF COURSE

5.1 Minimum qualifications for a director or chief instructor is ON 1 or 2nd class engineer, he will also hold a valid MED certificate and will have completed a MED III course.

5.2 The course may only be given at a fully equipped MED II centre as described in section #4.

5.3 The number of students on the course will not normally exceed twelve.

COURSE DESCRIPTIONS

MED I

6. PART A LIFESAVING APPLIANCES COURSE

6.1 General Description

This is a 9 hour course, the objective of which is to give the trainees practical experience in using the types of equipment normally found on small vessels and listed here. The course curriculum and presentation is designed by the school within the following framework.

6.2 Liferafts and Liferaft Equipment

A practical knowledge of the use and care of liferafts and liferaft equipment; the stowage, launching, inflation, handling, marking and lighting of inflatable liferafts; embarkation from vessel and from water, manoeuvring away from and towards the ship's side; using the drogue and quoit, assisting survivors on board; behaviour of rafts and effects on occupants; dangers associated with sea sickness and sickness precaution; morale, pain and exposure; guarding against damage to the raft.

Whenever possible, this will include swimming pool exercises in which all trainees must participate within their physical capabilities. When no pool is available, as much of the exercise as possible will be demonstrated in harbours, lakes or rivers.

On the rare occasions when no water is available, dryland inflation and demonstrations may be conducted.

6.3 Dory, Dinghy or Workboat

The use of a dory, dinghy or workboat as a lifeboat; stowage, handling, launching; equipment on board or equipping at time of emergency; sailing, rowing and handling the boat under oars.

So far as possible water exercises and/or demonstrations will be used to instruct in boat work.

On rare occasions when no water is available, dryland demonstrations supported by lectures and film may be substituted.

6.4 Lifejackets and Lifebuoys

Knowledge of the requirement to carry lifejackets and lifebuoys, care, stowage and use; lifebuoy lines and self-igniting lights; practical exercises in swimming pool.

6.5 Distress Signals

Knowledge of S.O.S., mayday and visual and sound distress signals.

Knowledge of the use and value of EPIRBS.

6.6 Emergency and Abandon Ship Procedures

An appreciation of the importance of instructing all crew members in the location and use of emergency equipment; an appreciation of the importance of maintaining emergency equipment in good condition.

MED I

7. PART B FIREFIGHTING COURSE

7.1 General Description

This is a 9 hour course, the objective of which is to give the trainees a practical knowledge in the use and care of the firefighting appliances which may be fitted on smaller vessels.

7.2 Portable Extinguisher

The proper use and care of water pressure, dry chemical and carbon dioxide extinguishers, including cleaning and recharging the two former types.

Knowledge of their limitations, advantages and disadvantages; practical use of portable extinguisher on small Class A and B fires in the open.

7.3 Hoses and Related Equipment

The use of hoses, couplings branches, fog jet nozzles, practical exercises in the open, using water to extinguish small Class A and B fires.

An appreciation of the use of small bore wash deck hoses for firefighting.

7.4 Lecture Topics

- The fire triangle the chemistry of fire;
- The theory of fire extinguishment;
- Heat, smoke, CO_2 and toxic gases;
- Heat conduction, radiation and air circulation in the vicinity of a fire;
- Where to get advice on small vessels, fire protection and extinguishing equipment;
- Precautions when fueling;
- Most critical areas on board ship;
- Effect of water free-surface on stability.

MED I

8. PART C SURVIVAL AND RESCUE

8.1 General Description

This is a five hour course, the objective of which is to give trainees a practical knowledge of survival techniques and an ability to best sustain themselves and their companions in an emergency.

8.2 An awareness of SAR in Canada and the U.S. and how to effectively cooperate to maximize the chances of rescue.

8.3 The use and visibility of all types of distress signals.

8.4 Being picked from the water or raft by surface or aircraft.

8.5 Assisting vessels and aircraft in distress.

8.6
- Effect of wind and sea on boats and rafts;
- simple use of charts including an ability to lay off a course to plot and to pick off positions by latitude and longitude or bearing and distance;
- Use of the magnetic compass.

8.7 Survival in a boat or raft: sickness, immersion, sores.

8.8 Survival on hostile shore or ice: exposure, shelter, morale, travel, obtaining food and water, making fire, attracting attention.

8.9 Care of survivors picked up from survival craft and from the water.

MED II

9. PART A LIFESAVING APPLIANCES COURSE

9.1 General Description

This is a five-day course, the intent of which is to give trainees a practical knowledge in the use and care of the lifesaving appliances listed below. At the conclusion of the course, the trainees will be required to write Part A of the multiple choice examination in Marine Emergency Duties. The actual presentation of the course, lectures and practical sections will be left to the school, but the following topics will in all cases be covered.

9.2 Lifeboats and Lifeboat Equipment

A practical knowledge of the use and care of lifeboats and lifeboat equipment; practical instructions in the training centre boats in pulling, sailing (if conditions permit) and handling under power; as far as possible, each trainee should be given the opportunity to take charge in such manoeuvres as getting away, laying alongside and turning the boat short round under oars and power.

Stepping masts, hoisting and setting sails and sailing; the danger of broaching to and breaking wave crests; handling in heavy weather; the use of droques and oil; running and landing through surf and beaching.

9.3 The Launching and Embarkation of Lifeboats Associated with Radial, Luffing and Gravity Davits

Practical instruction on school radial davits or models covering clearing away, swinging out, manning and lowering under all conditions with emphasis on efficient organization; safe practice with this type of equipment and proper orders. i.e., still, carry on, clear away, ship gripes, hoist away, vast hoisting, below, down chocks, swing out, launch aft, launch forward and bear out, bear out aft, haul away after guy, make fast after guy, make fast guys, start the falls, lower away, easy forward or aft, let go.

Allotment of duties to boat's crew; rotated to ensure the following duties are covered by each individual, pass out painter and tend lifelines; pass painter forward, ship plug and rudder, tend forward and after falls; tend forward guy, tend after guy, tend forward chocks and gripes and thus launch boat.

Practical instruction on school's quadrant or luffing davits, covering clearing away, swinging out, manning and lowering under all conditions with emphasis on efficient organization; safe practice on this type of equipment and proper orders; i.e., still, carry on, clear away, man handles, release gripes, turn down chocks, wind out together vast winding, easy forward or aft, lower away, start the falls, let go.

Allotment of boat's crew rotated to ensure the following duties are covered by each crew member: pass out painter, tend lifelines, pass painter forward, slip forward and after gripes and chocks, work davit handles, lower away keep falls clear, ship plug and rudder and tend lifelines.

Practical instruction of school's gravity davits covering clearing away, swinging out, manning and lowering under all conditions with emphasis on efficient organization, safe practice with this type of equipment and proper orders; i.e., still, carry on, clear away, release gripes, release brake, make fast tricing or bowsing tackles, slip bowsing-in gripes, load boat ease tricing or bowsing tackles, lower away, let go.

Allotment of duties to boat's crew to ensure the following duties are covered; pass out painter and tend lifelines, pass painter forward, release gripes fore and aft, ship plug and rudder; tend lifelines; tend control brake, make fast tricing gear and ship bowsing-in gripes. Ease tricing gear and lower boat.

9.4 The Launching and Embarkation of Inflatable Liferafts and Liferaft Equipment

The storage, launching, inflation, handling, marking and lighting of inflatable liferafts; righting capsized rafts, embarkation from ship and water; behaviour of rafts and effects on occupants; equipment, rations and precautions against damage to the raft; survival problems with particular reference to sea sickness, exposure and panic; liferaft storage, launching and embarkation gear.

Practical instructions in a swimming pool of how to board inflatable liferaft; use of rescue quoit; application of sea anchor to reduce drift and pulling away from danger; righting an overturned inflatable raft; demonstration of exterior equipment in pool and results of partial deflation.

9.5 Buoyant Apparatus or Rigid Liferafts

A practical knowledge of the use, storage, launching, and handling of rigid liferafts or buoyant apparatus.

9.6 Lifejackets, Lifebuoys, Self-Igniting Lights and Lifebuoy Lines

A knowledge of the Steamship Inspection requirements for adult and children's lifejackets, their inspection and storage; practical instruction in a swimming pool with lifejackets.

A knowledge of the Steamship Inspection requirements for lifebuoys, self-igniting lights and lines; practical demonstration of lifebuoy in swimming pool.

9.7 Emergency Radio Equipment

Practical operation of radio equipment as authorized for use on board, lifesaving equipment, automatic keying and use of such equipment as a D.F. device.

9.8 Emergency and Abandon Ship Procedures

A knowledge of the statutory requirements for boat drills as required under the Canada Shipping Act; a practical knowledge of the conduct of lifeboat drills, the marshalling of passengers and the avoidance of panic.

MED II

10. PART B FIREFIGHTING COURSE

10.1 General Description

This is a five-day course, the intent of which is to give trainees a practical knowledge in the use and care of shipboard firefighting appliances. It is also intended to provide theoretical and practical knowledge of firefighting techniques. At the conclusion of the course, trainees will be required to write Part B of the multiple choice examination in firefighting. The actual presentation of the course, both lectures and practical portions, will be left to the school, but the course standard will be as follows:

10.2 Portable Extinguishers

The proper use, care, inspection, testing maintenance and recharging of soda acid, carbon dioxide dry chemical and other approved portable extinguishers; knowledge of their limitations, advantages and disadvantages when used on various types of fires; definition of class A, B, and C fires; practical use of portable extinguishers on small class A or B fires in the open and then in enclosed spaces; practical instruction on recharging portable extinguishers; use of impregnated sand and non-inflammable blanket.

10.3 Hoses and Related Equipment

The use of lined and unlined hoses, their couplings, smooth bore and spray nozzles; deck service line hydrants and couplings; ship/shore connections, foam hoses, utilizing chemical, mechanical and high expansion foam; hose techniques, both theory and practical on small oil fires with jet spray nozzles.

10.4 Breathing Apparatus

The use and knowledge of the smoke helmet, safety harness, breathing apparatus and air hose, safety lamp, fire axes electric drills and protective clothing.

Use of self-contained breathing apparatus two types: oxygen and compressed air.

Practical exercises in smoke-filled atmosphere, no fire present.

10.5 Lecture Topics

The "fire triangle" of fuel, heat and oxygen and the effect of removing any one of these elements; heat smoke, CO_2 and toxic gases; the general distribution of heat and the natural circulation in the vicinity of the fire; how fire spreads in ships; the meaning of flash point, volatility, vapour pressure, ignition point, spontaneous combustion, ignition temperature, flammability limits, fire and explosion petroleum vapour and vapours travel; toxic properties of oils.

The common causes of ship fires including careless smoking and the improper use of matches and combustiles; neglect of safety precautions when repairs are being carried out; untidiness and cleanliness; loose oil, oil overflow, oil leaks, mixtures of oil and trash, spontaneous ignition of oil on a hot surface, spontaneous combustion; sources of ignition, sparks, steel alloys, magnesium, gnt, electrical, switches, appliances, dangers of portable lights and wandering leads, oil dripping on hot surfaces, static.

The prevention of fire by cleanliness, tidiness and careful disposal of all inflammable material, proper stowage and ventilation of cargo and other spaces; posting "NO SMOKING" notices, fitting spark and flame armestons and flame traps; spread of fire and smoke through ducting and piping, necessity of keeping ducting and filters clear of dust and other combustible deposits.

Effect of damage to and clogging of flame arresters; use of safety lamp and frequent and effective fire patrols; the detection of fire by mechanical fire and smoke detectors, and thermometers; the importance of fire drills and proper training of crew in firefighting duties (including regulation requirements) port fire alarm signals, liason with shore fire brigades especially during refit periods and dry docking; stability and pumping data.

The fire subdivision of a ship, fire bulkheads, Class "A" and "B" divisions, accommodation partitioning, ship ventilation, system controls, covers and dampers (manual and fail safe automatic), hatch closing appliances and deck emergency stop valves; main fire pumps, deck service pumps and fixed emergency pumps, automatic sprinkler systems and fixed foam installation.

Problems associated with fighting deep seated fires, containment by sealing off and boundary cooling, hold and engine room fires; the effect of large quantities of water on a vessel's stability and the use of pumps during firefighting operations.

10.6 Practical Firefighting Course

This must be considered one of the most important facets of the firefighting course, because although the average seaman has opportunity to operate firefighting appliances such as hoses and portable fire extinguishers during shipboard fire drill, it is only on a practical course does he meet conditions which approximate to the "real thing" and establish a greater degree of confidence in fighting fires than would otherwise be the case.

Exercises in a smoke-filled space, no fire present using smoke helmet, safety harness and breathing apparatus, and making the trainees find their way around in smoke and searching for objects and bodies.

Exercises involving class A and B fires in outside trays. Trainees to extinguish same using portable water pressure foam extinguishers which they have themselves charged.

Use of pumps and hoses on large open pit fire containing oil to show use of foam, and spray nozzles; in latter case one being used for cooling and one for extinguishing fire.

A series of exercises designed to simulate a fire in accommodation, galley, engine room and holds; these exercises would be carried out within the two-storey mock-up structure and involve use of portable extinguishers, breathing apparatus and fire hoses; the smoke, heat and humidity level should be progressively increased; there shall be before and after each exercise a briefing and debriefing session at which instructions are given before entering and criticism after fighting the fire; all trainees should participate in these discussions and not only the team involved.

MED II

11. PART C SURVIVAL AND RESCUE COURSE

11.1 General Description

This is a two-day course, the intent of which is to give trainees a practical knowledge of survival and rescue techniques and the ability to sustain themselves and others when beset by adverse conditions in a marine emergency. The actual presentation of the course lectures and the practical sections will be left to the school, but the basic standard will be as follows:

11.2 The search and rescue organizations in Canada and the U.S.A.; their objectives, responsibilities, functions and capabilities, the AMVER system.

11.3 The use and visibility of all types of distress signals aboard ships, boats and rafts; landing signals and breeches buoy drill.

11.4 The use of helicopters, hovercraft and aircraft in search and rescue operations; whenever possible CCG will cooperate with schools to provide practical exercises.

11.5 Rescue operations involving own ship and survivors from water, inflatable raft, lifeboat, ditched aircraft or helicopter, sunken submarine and an oil drilling rig.

11.6 Basic damage control including the construction of pads, cement boxes and bulkhead shoring, removal of water and temporary repairs to weeping seams and rivets.

11.7 Effect of wind and sea on boats, rafts; wind and current drift of lifesaving appliances; simple use of charts and general knowledge of prevailing winds; use of lifeboat compasses, application of variation and coastal recognition.

11.8 Behaviour in the boat or raft, morale, avoidance of fatigue and exposure in hot and cold weather, ventilation, damage repair, insulation, conservation of energy, allotment of duties to occupants, drinking water, solar stills and salting units, rations and extra food supplies, smoking, sea sickness, frost bite and immersion effects.

11.9 Survival on land, attracting attention, protection from exposure, use of the raft as shelter, movement and travel, arctic, tropical and temperate conditions, the enemies of survival, group behaviour and personality requirements, signals to attract attention, fires, obtaining food and water.

12. MED III

General Description

Persons applying for acceptance on a MED III course must be in possession of a valid MED II certificate.

The course is five days' duration and must be completed as a single unit.

13. LIFESAVING

13.1 This section comprises one-half day of theory, lecture and audio/visual material, followed by a full day of practical exercises during which each student will have an opportunity to command.

13.2 Theoretical curriculum comprises:

- Search and Rescue procedures.
- Latest developments respecting lifeboats, survival modules, liferafts, lifejackets and exposure suits and their application from the perspective of both user and rescuer.
- The importance of preparing the crew to meet any emergency.
- The importance of leadership and morale to survival.
- Sustenance and comfort of survivors.
- Examination of Lifesaving equipment. ½ Day

13.3 Practical curriculum comprises:

- Practical organization of boat drill.
- Practical abandon ship procedures using lifeboats, liferafts and davits.
- Last man off including the allocation of survival craft space and head count.
- Organization of survivors for helicopter evacuation and lift off exercises, simulated or real (practical or theory).
- The abandon ship decision (Theory).

1 Day

14. FIREFIGHTING

14.1 This section is arranged in a manner similar to that described in 13.1.

14.2 Theoretical curriculum comprises:

- Fires at sea, in port, refit, lay-up and dry dock.
- Capabilities, limitations and inspection of fixed installations aboard ships.
- Sprinklers, fire curtains, foam makers, CO_2 systems, halon system, inert gas systems and ventilation.
- Detection systems, testing and inspection.
- Chain of command.
- Examination of portable firefighting equipment.
- The formation of a plan of attack, organization of resources to implement the attack and the contingency plan. This will include consideration of stability complications and the removal of excess water from compartments.

½ Day

14.3 Practical curriculum comprises:

Practical firefighting and drill organization
- The direction of extinguishment of fire in the mock-up.

- Direction of search and rescue from smoke-filled compartment - or by simulation using taped masks or other devices.
- Importance of resuscitation of victims.

1 Day

15. SHIP HANDLING AND MANAGEMENT

15.1 This section is intially classroom instruction comprising one and a half days studying the following topics:

- Emergency orientation of new crew members.
- Handling the ship to render assistance.*
- Preparation and planning a rescue operation.
- Manoeuvring to pick up survivors.
- Demonstrate the effect of introducing water into the ship.
- Minimizing free water effect.
- Calculation of flooding rates in preparing the plan.
- Permeability and the use of stability data in determining stability in firefighting plans or operations.
- Importance of watertight integrity and the most vulnerable areas to bilging.
- Pumping, draining and the education of excess water.
- Discussion and formulation of ship's emergency procedures guide.
- Theory of damage control and the formulation of plans for emergencies.
- Feasibility of jury rigs.
- Pressurizing tanks, double bottoms, cofferdams, etc.
- Handling the ship when rendering assistance to special types or to vessels carrying hazardous cargoes.

* Including the requirement to respond to appropriate agencies.

- Knowledge of:
  1. NATO document Defence of Merchant Ships.
  2. Notice to Mariners 1978 #s28, 31, 33, 35.
  3. STCW 1978, Resolution 19.

1½ Days

16. The final half-day is reserved for student evaluation and course critique.

17. Successful completion of a Cardiac Pulmonary Resuscitation (CPR) Course will be a requirement to obtain a MED III Training Certificate EXN 24.

PREREQUISITES

FOR

FAST RESCUE CRAFT COURSE

- Recent Medical
- M.E.D. Certificate

FAST RESCUE CRAFT COURSE

Course Objective:

1. To give students a detailed theoretical and practical knowledge in handling F.R.C. and rescue techniques during rescue operations.

2. To give students a practical knowledge in casualty recovery with respect to handling of hypothermic and severely injured persons.

3. To give students a detailed knowledge of F.R.C. and associated equipment construction, preventive maintenance and repairs to ensure equipment is maintained to a standard acceptable to the governing regulations.

4. To give students a knowledge of equipment and personal limitations to ensure necessary understanding when making decisions with respect to the safe and effective rescue operation.

5. To give students a knowledge of proper Search, Day and Night Communications, and Transfer procedures.

6. To give students an understanding and appreciation for the necessity of initiating, conducting and documenting drills on a regular basis. This will permit comparison, progressive training and help to establish increased practical limitations in F.R.C. use.

COLLEGE OF FISHERIES, NAVIGATION, MARINE ENGINEERING & ELECTRONICS

FAST RESCUE CRAFT COURSE

DURATION: 4 days (35 + 4)

MAIN COMPONENTS:

1. Detailed theoretical and practical training with respect to the following:-

   a) F.R.C. Technical - Students to perform and understand launch/recovery daily procedures, firefighting, trouble shooting, preventive maintenance and repair.

   b) F.R.C. Handling - Students to perform safe craft handling during real and hypothetical situations, including evaluation and decision making.

   c) Safety and Rescue Equipment - Students to perform practical exercises with safety and rescue equipment.

   d) Rescue Techniques - Students to perform rescues with and without equipment in different situations.

   e) Self recovery with personal equipment.

   f) Students to perform exercises, to ascertain effectiveness in transferring persons from F.R.C. to stand-by vessel.

   g) Training in the handling and initial treatment of casualties during exercises in combination with rescue techniques as it would appear in a rescue situation.

   h) Search, communications and rescue operations procedure and limitations.

   i) Regular drills, exercises and daily procedures.

2. Theoretical and practical examination.

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
0900 to 1000	1. Registration & Introduction 2. Philosophy of FRC	7. Launch & Recovery Rescue Techniques	10. FRC Rescue Equipment Theory	17. Theory of Transfer from Rafts & Tempsc
1000 to 1100	3. Introduction to FRC & Regulations	PRACTICAL TRAINING	PRACTICAL TRAINING	18. Theory of transfer to ship using standby vessel equipment
1100 to 1200	4. FRC Stop Start Handling Principles	#2	#3	19. Rescue Drill Regulation & Daily Procedures
1200 to 1300	5. Suits and Personal Equipment			LUNCH
1300 to 1400	LUNCH	LUNCH	LUNCH	PRACTICAL TRAINING
1400 to 1500	6. Equipment Theory Effectiveness & Safety Precautions	8. Hypothermia and	11. Repair & Maintenance of Equipment	#5
1500 to 1600	PRACTICAL TRAINING	Casualty Handling	12. Search and Lookout Procedures 13. Communications	EXAM PRACTICAL
1600 to 1700	#1	FRC Technical Theory	14. Rescue Operation Limitations 15. Psychology	EXAM THEORETICAL
1700 to 1800		Specifications Fault Finding	16. Groupwork	COURSE DEBRIEF & CERTIFICATE PRESENTATION
	C.P.R.		#4 Practical Session	

COLLEGE OF FISHERIES, NAVIGATION, MARINE ENGINEERING & ELECTRONICS

FAST RESCUE CRAFT COURSE

LECTURES & DISCUSSIONS

1. Registration & Introduction
   - Students to complete registration forms
   - Course outline & standards
   - Handouts

2. Philosphy of F.R.C.
   - Purpose)
   - Duty) Achievement
   - Expectation)
   - Motivation

3. F.R.C. Regulations & Guidelines
   - C.O.G.L.A.
   - N.L.P.D.
   - PITS
   - Coast Guard

4. Introduction to F.R.C.
   - Physical characteristics
   - Different types (slides)
   - Operating Controls
   - Water Jet - Outboard Engine Handling Principles
   - Start/Stop Procedures

5. Different Types of Suits and Personal Safety Equipment
   - Principles of Protection
   - Design differences
   - Material differences
   - Personal Equipment
     a) Harness
     b) Safety Line
     c) Knife.

d) Flashlight

e) Beacon Light

f) Work Line

6. Equipment use, effectiveness and precautions

- Suits
- Harness
- Safety Line
- Work Line
- Rescue Swimming Equipment

7. (i) Launch & Recovery of F.R.C.

- Different types of launch/recovery systems
  a) single point davit
  b) crane
- Different types of hooks
  a) open
  b) off load
  c) safety
- Different types of hook up equipment
- Placement of launch/recovery equipment
- Launch Procedures
- Recovery Procedures
- FRC handling during recovery.

(ii) Rescue Techniques (no equipment used)

- principles
- dangers
- limitations
- conscious and unconscious victims

8. (i) Hypothermia (Medicore)
- Handling of victims
- Diagnosis (theory)
- Treatment (theory)

(ii) - Casualty Handling (Medicore)
- recovery from water
- transportation
- transfer to stand-by vessel
- immediate first aid

9 F.R.C. Technical Theory
- Hull
- Collar
- Engine
- Water jet/outboard
- Console
- Self righting
- Emergency start/stop procedures
- Fault finding
- Firefighting Systems
- Alarm systems
- Safety equipment and use

10. F.R.C. Rescue Equipment
- Rescue frame
- Rescue lines
- Horse Collar, hooks, lifebuoy
- Reaching aids

11. Repair and Maintenance
- Procedures
- Storage
- Repair & maintenance equipment
- Practical instruction and training in necessary repairs

N.B. Students are required to complete repairs to personal equipment, during the course.

12. Search Procedure

- Night/Day Differences
- Lookouts
- Patterns
- Organization

13. Communications

- Standby vessel - FRC
- Problems
- Procedures
- Equipment

14. Rescue Operation Limitations

- Crew capability
- Rescue Equipment capability
- F.R.C. launch/recovery capability
- Weather conditions

15. Psychology of Rescue Operations

- Behaviour of Rescue Personnel & Casualties
- Morale & Attitude Towards Operation
- Casualty Handling

16. Groupwork

- Scenario to be solved in groups and then discussed

17. Theory of Transfer from Rafts & TEMPSC

- Raft & TEMPSC Shapes and limitations
- Approaches
- Pacing
- Dangers
- Equipment

18. Theory of Transfer to Ship
- Rescue Baskets
- Open rafts
- Scramble nets
- Rescue hooks
- Line throwing appliance
- Life buoys
- Optional equipment

19. Rescue Drill Regulations & Daily Procedures
- Discussion of regulations
- How to apply these regulations
- Proposition of scheduling
- Daily/weekly exercises routine and recommendations

20. Exam
- Theoretical

21. Course Debriefing & Evalutation

22. Certificate Presentation

PRACTICAL TRAINING # 1 (Pool)

Pool training to familiarize students with swimming and safety equipment and to improve their inwater confidence.

Programme:

a) Introduction to equipment

b) Donning of equipment

c) Practical use of equipment

PRACTICAL TRAINING # 2 (Sea)

PROGRAMME:

1. Practical Introduction to F.R.C.
   - Start
   - Handle
   - Stop

2. Familiarization with suits and safety equipment during exercises.

3 Casualty Pick-Up
   - Different methods - without special equipment

PRACTICAL TRAINING # 3 (SEA)

- Use of
  a) Rescue Frame
  b) Harness & Lines
  c) Safety Equipment
- Perfection in F.R.C. handling and pick-up procedure
- Surface swim

PRACTICAL TRAINING # 4 (SEA) (Wednesday Evening)

- Practical exercises covering a whole rescue operation - preferably during darkness. (F.R.C. - Beinir)

- Special programme and safety procedures to be drawn up and followed.

PRACTICAL TRAINING # 5 (SEA)

- Transfers and Pacing (F.R.C. - Beinir)
- Rescue Basket
- Pick up with rescue equipment
- Surface Swimming
- Practical Exam

ANNEX G

* L-60 Offshore Standby Vessels

The Board has ruled that a vessel designated as a suitable standby craft by the Canada Oil and Gas Lands Administration (COGLA) in accordance with Section 18 of the Canada Oil and Gas Drilling Regulations shall be equipped as follows:

(1) Lifeboats and liferafts as required by the appropriate section of the Life Saving Equipment Regulations or the alternative equipment as permitted by Board Meeting No. 3826 dated September 17, 1982 and as outlined in Notice to Surveyors L-16 or as required by the Flag Administration's Regulations provided that these requirements are not less than the Canadian Standard.

(2) All other equipment required by the Lifesaving Equipment Regulations for a vessel of the appropriate size and class.

(3) The following additional equipment:

a) additional liferafts such that the total is sufficient in number to accommodate 300% of the certified complement;

b) if not already included two searchlights complying with the requirements of the Navigating Appliance Regulations Section 56;

c) 2 suitable scramble nets with provision for rigging one on each side of the vessel or both on either side of the vessel;

d) if not already included, one approved rigid or inflated rescue boat of not less than 4.88 m (16 ft) in length with suitable launch/recovery system and to be designed and equipped as follows:

* L-60 (Cont'd)

i) to be of a sufficiently low freeboard, or provided with means that two operators can readily bring aboard an unconscious person wearing a lifejacket or survival suit from the water;

ii) to be equipped with;

1. An inboard or outboard motor, capable of maintaining [15] knots for 1 hour when carrying full complement and equipment;

2. means of towing a survival craft;

3. an efficient searchlight; and

4. a two way radio means of voice communication to the stand-by craft, and mutually between all rescue craft carried aboard the stand-by craft. This includes 158.8 kHz (Channel 16) and 158.3 kHz (Channel 6).

e) Four suitable rescue hooks,

f) First aid supplies sufficient in quantity for the treatment of:

1) at least ten persons having extensive second degree burns;

2) at least five persons having arm or leg fractures; and

3) at least five persons suffering from hypothermia.

g) If a vessel is required by existing regulation to carry two lifebuoys with lines, two additional buoys with lines shall also be carried for a total of four lifebuoys with lines. This is not to prejudice other lifebuoys that are required to be carried.

When a vessel is designated as a suitable standby craft, an inspection shall be carried out to confirm that this additional equipment is on board. Future inspection of this equipment shall be carried out at the time of our mandatory annual inspection. The surveyor shall also ensure that the crew of the vessel is efficient in the use of the additional equipment.

* L-60 (Cont'd)

After completion of a satisfactory inspection, the surveyor shall endorse the Inspection Certificate to indicate that the vessel has been designated as a suitable standby craft by COGLA in accordance with Section 18 of the COGLA Drilling Regulations. He shall also attach a Letter of Compliance to the certificate detailing the additional equipment carried. A sample copy of the Letter of Compliance is attached.

COGLA, Ottawa advises that this will be effective 31 January, 1984. They have asked that Ship Safety office wait for the local COGLA office to contact them.

Canadian Coast Guard | Garde côtière canadienne

STANDBY CRAFT

LETTER OF COMPLIANCE

NAME OF SHIP	OFFICIAL NO.	GROSS TONNAGE	PORT OR REGISTRY

This is to certify that:-

1. The above mentioned ship has been designated as a suitable standby craft by the Canada Oil and Gas Lands Administration in accordance with the provisions of Section 18 of the Canada Oil and Gas Drilling Regulations and is certified to operate as a standby craft for_____ voyages.

2. For standby operations the number of persons, including Master, comprising the crew is_____.

3. The inspection showed that the ship carried:

a) _____inflatable liferafts capable of accommodating _____persons;

b) _____search lights;

c) _____scramble nets;

d) _____rescue boat with suitable launch/recovery system;

e) _____rescue hooks;

f) _____first aid kit including supplies for treatment of burns, fractures and hypothermia;

g) _____lifebuoys with heaving lines.

This letter is issued under the authority of the Government of Canada. It will remain in force until_____.

Issued on:_____

Signed:_____
Steamship Inspector

This letter to be displayed and its validity is contingent upon the validity of the vessel's Inspection Certificate.

Canada

PROPOSED STANDARDS FOR THE CONSTRUCTION, INSPECTION, AND TESTING OF RESCUE BOATS

MARCH 1984
OTTAWA

HIGHLIGHTS OF CONTENTS

"PROPOSED STANDARDS FOR THE CONSTRUCTION, INSPECTION, AND TESTING OF RESCUE BOATS"

Short Title

1. These Standards may be cited as the Standards for Rescue Boats.

Interpretation

2. In these Standards,

"approved" means approved by the Board;

"approved service depot" is an establishment approved by the Board to service inflated appliances in accordance with the Standards for Servicing Approved Inflated Boats;

"A.S.T.M." means the American Society for Testing and Materials;

"Board" means the Board of Steamship Inspection created pursuant to Part VIII of the Canada Shipping Act;

"C.G.S.B." means the Canadian General Standards Board;

"inflated rescue boat" is an appliance which depends upon non-rigid, gas or air filled chambers for buoyancy, which may be fitted with a rigid hull, and which is kept inflated for use at all times;

"inspector" means a steamship inspector appointed pursuant to section 366 of the Canada Shipping Act;

"rescue boat" is a boat designed to rescue persons in distress and to marshal survival craft;

"survival craft" is a craft capable of sustaining the lives of persons in distress from the time of abandoning the ship;

"thermal protective aid" is a bag or suit made of waterproof material with low thermal conductivity.

GENERAL REQUIREMENTS

3. Every prototype rescue boat shall be tested for compliance with these Standards in accordance with the testing procedures prescribed in the Standards on Prototype Testing of Life Saving Appliances. *

4. An application for approval of a rescue boat shall be made in accordance with Schedule lll to these Standards.

5. An inspector shall be satisfied that the construction of a rescue boat is in accordance with the approved plans.

6. Every rescue boat shall be constructed, tested, inspected and serviced in compliance with these Standards and the requirements of the Life Saving Equipment Regulations.

7. Rescue boats built outside Canada may be accepted as equivalent equipment complying with these Standards if they are built in accordance with plans and specifications approved by the Board and certificated by the Government authority of the country in which they are built.

8. Notwithstanding any requirements of these Standards, the Board may allow alternative constructional features or fittings, providing the Board is satisfied that such constructional features or fittings are equivalent to the requirements of these Standards.

9. Rescue boats may be either of rigid or inflated construction or a combination of both and shall:
   (a) be not less than 3.8m and not more than 8.5m in length; and
   (b) be capable of carrying not less than five seated persons and one person lying down.

10. (1) Every rescue boat shall be:
   (a) fitted with retro-reflective tape in accordance with Schedule 1 to these Standards;
   (b) provided with equipment in accordance with Schedule 11 to the Standards;
   (c) fitted with watertight lockers or compartments for the stowage of small items of equipment as prescribed in Schedule 11 to these Standards;
   (d) provided with bridles, lifting hooks or other suitable means of enabling the boat to be raised or lowered with its full complement of persons and equipment.

* Standards under development

(2) The lifting arrangements referred to in paragraph 10(1)(d) shall have a safety factor of 6:1.

11. (1) Unless the rescue boat has adequate sheer to the satisfaction of the Board, it shall be provided with a bow cover for not less than 15 per cent of its length.

(2) In cases where an enclosure or canopy is fitted the vertical distance between such covers over 50 per cent of the floor area shall be

(a) not less than 1.3m for a rescue boat permitted to accommodate nine persons or less

(b) not less than 1.7m for a rescue boat permitted to accommodate twenty-four persons or more; and

(c) not less than the distance as determined by liner interpolation between 1.3m and 1.7m for a rescue boat permitted to accommodate between nine and twenty.

MANOEUVRABILITY AND TOWING

12. Every rescue boat shall be of sufficient strength to enable it to be safely lowered into the water when loaded with its full complement of persons and equipment and to be capable of being launched and towed when the ship is making headway at a speed of 5 knots in calm water.

13. Arrangements for towing shall be permanently fitted in the rescue boat and shall be sufficiently strong to marshal or tow life rafts as prescribed by Section 16.

14. The towing arrangements referred to in Section 13 and means of connections shall have a safety factor of 6:1.

15. Every rescue boat shall be fitted with a release device to enable the forward painter to be released when under tension.

16. A rescue boat shall have sufficient mobility and manoeuvrability in a sea-way to enable persons to be retrieved from the water, to marshal life rafts and to tow the largest life raft carried on the ship when loaded with its full complement of persons and equipment, or its equivalent, at a speed of not less than two knots.

STABILITY

17. Every rescue boat shall be of such form and proportions that it shall have ample stability in a sea-way and sufficient freeboard when loaded with its full complement of persons and equipment.

18. Every rescue boat, when loaded with one half of the number of persons the rescue boat is certificated to accommodate seated in their normal positions to one side of the centreline, shall have a freeboard, measured from the waterline to the lowest opening through which the rescue boat may become flooded, of not less than 1.5 per cent of the rescue boat's length and in no case less than 100mm.

19. Every rescue boat in a flooded condition shall be capable of maintaining positive stability when in an upright position in calm water and loaded with its full complement of persons and equipment.

IMPACT AND DROP REQUIREMENTS

20. Every rescue boat shall be of sufficient strength to withstand, when loaded with its full complement of persons and equipment and with, where applicable, skates or fenders in position, a lateral impact against the ship's side at impact velocity of not less than 3.5m/s and also a drop into the water from a height of not less than 3m for a rigid rescue boat and not less than 6m for an inflated boat.

CARRYING CAPACITY

21. A person shall be deemed to weight 75 kg for the purposes of these Standards.

22. Seating in rescue boats shall be provided on thwarts, benches or fixed chairs fitted as low as practicable in the rescue boats and constructed so as to be capable of supporting the number of persons each weighing 100 kg for which spaces are provided in accordance with paragraph 23 (b).

23. The number of persons a rescue boat is permitted to accommodate shall be equal to:

(a) the number of persons having an average mass of 75 kg, all wearing lifejackets, that can be seated in a normal position without interferring with the means of propulsion or the operation of any of the rescue boat's equipment; or

(b) the number of spaces that can be provided on the seating arrangements in accordance with figure 1*.

NOTE: The shapes may be overlapped as shown, provided foot-rests are fitted and there is sufficient room for legs and the vertical separation between the upper and lower seat is not less than 350 mm.

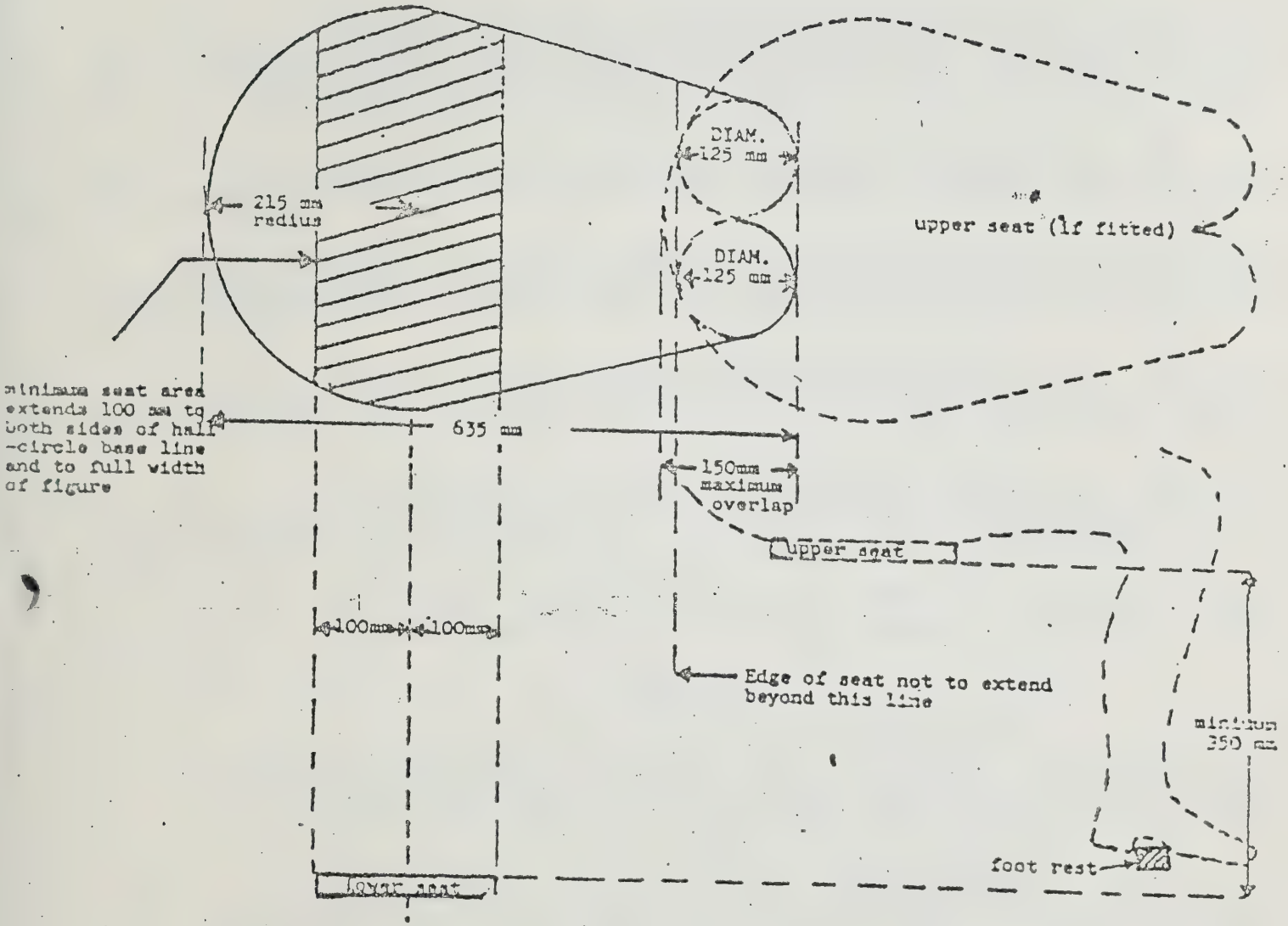


Figure 1

24. Each seating position shall be clearly marked in the rescue boat.

ACCESS INTO RESCUE BOATS

25. On passenger ships every rescue boat shall be so arranged that it can be rapidly boarded by its full complement of persons.

26. On cargo ships every rescue boat shall be so arranged that it can be boarded with its full complement of persons in not more than three minutes from the time the instruction to board is given.

27. Rapid disembarkation from rescue boats shall also be possible.

28. Every rescue boat shall have a boarding ladder than can be used on either side of the rescue boat to enable persons in the water to board.

29. The lowest step of the ladder referred to in section 27 shall be not less than 0.4m below the rescue boat's light waterline.

30. The rescue boat shall be so arranged that helpless people can be brought on board either from the sea or on stretchers.

31. All surfaces on which persons might walk shall have a non-skid finish.

FITTINGS

32. All rescue boats shall be provided with means to drain water from the inside of the rescue boat when it is not waterborne and such means shall prevent the entry of water when the boat is waterborne.

33. Each drain valve shall be provided with a cap or plug to close the valve, which shall be attached to the rescue boat by a lanyard, a chain, or other suitable means.

34. Drain valves shall be readily accessible from inside the boat and their position shall be clearly indicated.

35. All rescue boats shall be provided with a rudder and tiller.

36. When a wheel or other remote steering mechanism is also provided, the tiller shall be capable of controlling the rudder in case of failure of the steering mechanism.

37. The rudder shall be permanently attached to the rescue boat.

38. The tiller shall be permanently installed on, or linked to, the rudder stock; however, if the rescue boat has a remote steering mechanism, the tiller may be removable and securely stowed near the rudder stock.

39. The rudder and tiller shall be so arranged as not to be damaged by operation of the release mechanism or the propeller.

40. Except in the vicinity of the rudder and propeller, a buoyant lifeline shall be becketed around the outside of the rescue boat.

41. Rescue boats which are not self-righting when capsized shall have suitable handholds on the underside of the hull to enable persons to cling to the rescue boat.

42. The handholds shall be fastened to the rescue boat in such a way that when subjected to an impact sufficient to cause them to break away from the rescue boat they break away without damaging the rescue boat.

43. Every rescue boat shall be fitted with a release mechanism complying with the following requirements.

(a) the mechanism shall be controlled from a single point and be capable of releasing all hooks simultaneously;

(b) except as provided in paragraph (c), the mechanism shall be of a type which will only release the rescue boat when it is waterborne or when the rescue boat is attached to the release mechanism and is being towed through the water;

(c) in the event of winch failure or damage of the launching arrangements which prevents lowering of the rescue boat to the water, the mechanism shall be capable of releasing the rescue boat; this release capability shall be adequately protected against accidental or premature use;

(d) the release control shall be clearly marked in a colour that contrasts with the surroundings;

(e) the mechanism shall be capable of releasing the rescue boat under any conditions of loading from no-load with the rescue boat waterborne to a load of 1.1 times the total mass of the rescue boat loaded with its full complement of persons and equipment.

(f) the mechanism shall be designed with a factor of safety of six on the ultimate strength of the materials used, assuming the mass of the rescue boat is equally distributed between the bridles, lifting hooks or other suitable launching means.

44. A rescue boat stowed 4.5m or more above water in light ship condition shall have skates or feeders to facilitate launching and prevent damage to the rescue boat.

PROPULSION

45. A rescue boat shall be fitted with an inboard engine or outboard motor to the satisfaction of the Board.

46. No engine shall be used for any rescue boat if its fuel has a flashpoint of $43^{o}C$ or less (closed cup test).

47. An inboard engine shall comply with the following requirements.

(a) it shall be powered by a compression ignition engine.

(b) the engine shall be provided with either
  (i) a manual starting system;
  (ii) a starting system with two independent power sources; and
any essential starting aids;

(c) the engine starting arrangements and aids shall start the engine at an ambient air temperature of minus $30^{o}C$ within two minutes of commencing the engine start procedure and at $0^{o}C$ without starting aids;

(d) the power start arrangement shall be equipped with a rechargeable energy source;

(e) the starting arrangement shall not be impeded by the engine casing, thwarts or other obstructions;

(f) the engine shall be capable of operating for not less than 5 minutes after starting from cold with the boat out of the water;

(g) the engine shall be capable of operating when the boat is flooded up to centreline of the crank shaft;
(h) the propeller shafting shall be so arranged that the propeller can be disengaged from the engine;
(i) the exhaust pipe shall be so arranged as to prevent water from entering the engine in normal operation;
(j) provisions shall be made for ahead and astern propulsion of the rescue boat;
(k) the engine shall operate under conditions of at least 20 degrees list and 10 degress trim;
(l) the engine circulating pumps shall be self priming;
(m) the engine shall be efficiently ventilated;
(n) the engine, transmission and engine accessories shall be
  (i) enclosed in a fire-retarding casing or other suitable arrangements providing similar protection
  (ii) arranged to protect persons from coming into accidental contact with hot or moving parts; and
  (iii) protected from exposure to the elements.

48. Notwithstanding section 46 ., gasoline driven outboard motors with an approved fuel system may be fitted in rescue boats provided the fuel tanks are specially protected against fire and explosion to the satisfaction of the Board.

49. An outboard motor shall be capable of starting at an ambient air temperature of minus 30°C.

50. The rudder and tiller may form part of the engine of a rescue boat fitted with an outboard motor.

51. Starter batteries shall be provided with casings which form a watertight enclosure around the bottom and sides of the batteries and the battery casings shall have a light fitting top which provides for necessary gas venting.

52. The rescue boat engine and accessories shall be designed to limit electro-magnetic emissions so that engine operation does not interfere with the operation of radio life saving appliances used in the rescue boat.

53. Means shall be provided for recharging all engine starting, radio and searchlight batteries.

54. Radio batteries shall not be used to provide power for engine starting.

55. Means shall be provided for recharging rescue boat batteries from the ship's power supply at a supply voltage not exceeding 55 V which can be disconnected at the rescue boat embarkation station.

56. In the case of boats propelled by outboard motors, the maximum horsepower (kw) motor that may be used shall be established by the manufacturer of the rescue boat and this information shall be permanently marked in a conspicous position on the boat.

57. All rescue boats shall be designed with due regard to the safety of persons in the water and to the possibility of damage to the propulsion system by floating debris.

58. A fully loaded rescue boat shall be capable of manoeuvring at a speed of at least 6 knots for a period of not less than 4 hours.

59. Fuel systems shall meet the following requirements

(a) fuel tanks shall be of substantial construction of steel or other accepted material and joints must not depend on solder for tightness;

(b) fuel tanks if made of steel shall be galvanized externally;

(c) fuel tanks shall have provisions for sealing the air vent when the tanks are not in use, in order to prevent spillage of fuel;

(d) fuel tanks shall have suitable filling and relief arrangements;

(e) fuel piping may be of suitable non-metallic material and its end connections shall be self-sealing;

(f) provisions shall be made for shutting off the fuel at the engine;

(g) fuel tanks and connections shall be capable of withstanding hydraulic pressure corresponding to a head of at least 4.5m above the top of the tank.

60. Where an outboard motor is provided, spare fuel may be carried in suitable containers.

61. Where outboard motors are carried they shall be maintained in operational condition and serviced annually by a competent mechanic.

62. The propulsion system shall be maintained in a state of operational readiness for immediate use in case of emergency.

63. Water resistant instruction printed in both English and French for starting and operating the propulsion system shall be provided and mounted in a conspicuous place near the engine starting controls.

MARKINGS

64. The dimensions of a rescue boat shall be marked on it in clear permanent characters.

65. The name and port of registry of the ship to which the rescue boat belongs shall be marked on each side of the rescue boat's bow.

66. Means of identifying the ship to which the rescue boat belongs and the number of the rescue boat shall be marked in such a way that they are visible from above.

67. A rescue boat shall be marked with a manufacturing serial number, the maker's name or trademark and the date of manufacture.

68. All markings and instructions shall be in both English and French where applicable.

69. Where indelible markings are made on an inflated boat, the marking material shall not contain ingredients harmful to the boat's fabric.

70. Complete details of all markings shall be included in the submission of the specifications.

71. When an inspector has determined the capacity of a rescue boat and is satisfied following an inspection of the boat, he shall cause it to be marked in permanent characters not less than three inches in height with the following symbol and information:

(a) the symbol "$";
(b) the maximum number of persons to be carried as approved by him;
(c) the date of inspection of the boat; and
(d) his initials

PART 11

RIGID RESCUE BOATS (Additional Requirements)

72. The hulls of rigid rescue boats shall be constructed with fire retarding or non-combustible material to the satisfaction of the Board.

73. Boatbuilders who intend to build rescue boats of glass reinforced plastic material (G.R.P.), must satisfy the Board that such material meets the requirements for G.R.P. material as prescribed in the Life Saving Equipment Regulations.

74. Every rigid rescue boat shall have inherent buoyancy or shall be fitted with inherently buoyant material sufficient to float the rigid rescue boat, loaded with all its equipment when flooded and open to the sea.

75. Notwithstanding the requirements of section 74 every rigid rescue boat shall be provided with inherently buoyant material equal to 280 N of buoyant force per person for the number of persons the rescue boat is permitted to carry.

76. Buoyant material, unless in addition to that required in sections 74 and 75 shall not be installed externally to the hull of the rescue boat.

77. The inherently buoyant material referred to in sections 74 and 75 shall be

(a) tested in accordance with the procedures prescribed in the Standards On Prototype Testing Of Life Saving Appliances;*
(b) proof against deterioration by petroleum products and by the elements; and
(c) constructed of a material tested in accordance with A.S.T.M. D-1692.

78. Every prototype rigid rescue boat shall be of sufficient strength to withstand a load of twice the total mass of the rescue boat when loaded with its full complement of persons and equipment.

79. The prototype load test referred to in section 78 shall be made in accordance with the procedures prescribed in the Standards On Prototype Testing Of Life Saving Appliances*

* Standards under development

REPAIRS

80. Repairs to rigid rescue boats shall be made in accordance with the manufacturer's repair manual using materials recommended by the manufacturer or be of an equivalent standard to the satisfaction of the Board.

PART 111

INFLATED RESCUE BOATS (Additional Requirements)

CONSTRUCTION

81. Every inflated rescue boat shall be:

(a) constructed in such a way that, when suspended by its bridle or lifting hooks it is of sufficient strength and rigidity to enable it to be lowered and recovered with its full complement of persons and equipment;

(b) of sufficient strength to withstand a load of 4 times the mass of its full complement of persons and equipment at an ambient temperature of 20° +3° C with all relief valves inoperative; and 1.1 times the mass of its full complement of persons and equipment at an ambient temperature of minus 30°C, with all relief valves operative.

(c) capable of withstanding exposure

(i) on an open deck on a ship during the period of time elapsing between servicing; and

(ii) for 30 days afloat in all conditions;

(d) provided with rubbing strips

(i) underneath the bottom of the boat;

(ii) on vulnerable places on the outside of the buoyancy tubes;

(e) provided with becketed lifelines inside and outside the boat;

(f) provided with suitable patches or adequate arrangements for securing the painters fore and aft and the becketed lifelines;

(g) provided with suitable towing connections that have a safety factor of 6:1; and

(h) serviced annually in accordance with the Standards For Servicing Inflatable Boats.

TRANSOM

82. Where a transom is fitted in an inflated rescue boat, it shall not be inset by more than 20 per cent of the overall length of the rescue boat.

BUOYANCY TUBES

83. The buoyancy of an inflated rescue boat shall be provided by either a single tube sub-divided into at least five separate compartments of approximately equal volume or two separate tubes neither exceeding 60 per cent of the total volume.

84. The buoyancy tubes shall be so arranged that in the event of any one of the compartments being damaged, the intact compartments shall be able to support the number of persons the rescue boat is certified to accommodate, each deemed to have a mass of 75 kg, and seated in their normal positions with positive freeboard over the rescue boat's entire periphery.

85. The buoyancy tubes forming the boundary of the inflated rescue boat shall on inflation provide a volume of not less than $0.17m^3$ for each person the boat is certified to accommodate.

MATERIALS

86. (1) The materials used in the construction of the buoyancy chambers of an inflated rescue boat shall

(a) have a breaking strength of not less than 1780 N, tested in accordance with CGSB Specification No. 4-GP-2 Method 9.1 for the 25.3mm strip method;

(b) be resistant to weathering so that after 30 cycles in an Atlas twin arc Weather-ometer the tensile strength of the material does not decrease by more than 10 per cent;

(c) be resistant to petroleum products so that after 24 hours immersion in solvent. Reference Fuel A, A.S.T.M. D-471, the tensile strength of the material does not decrease by more than 5 per cent; and

(d) be abrasion resistant to the extent that at least 5000 revolutions of a Taber abraser, using No. H22 wheel and 1000 grams loading, are required to completely wear through a sample.

87. (1) The breaking strength of the material incorporating a seam in the buoyancy chambers of an inflated approved boat shall be not less than 90 per cent of the breaking strength of the material.

(2) The breaking strength of the material incorporating a seam referred to in subsection (1) shall be tested by pulling the material at right angles to the seam.

88. The requirements prescribed in section 86 and 87 shall be ascertained by a testing establishment acceptable to the Board.

INFLATION SYSTEM

89. (1) Every boat shall have

(a) a non-return valve fitted to each chamber to allow the boat to be inflated by hand and valves which enable the boat to be inflated by compressed air or gas may also be fitted; or

(b) valves which permit both these operations may be fitted.

(2) A safety relief valve, designed to allow gas or air to escape should the pressure exceed that which would be safe for the tubes to carry, shall be fitted to each buoyancy chamber.

(3) The safety relief valve shall reseat at a pressure that will give satisfactory rigidity to the tube.

(4) Means of deflating shall be fitted to each chamber and be arranged to prevent accidental deflation.

90. If gas is used for inflation it shall be non-flammable and non-toxic.

91. Details of the construction, position and method of securing the inflation and deflation system to each chamber shall be submitted to the Board for approval.

BUOYANCY TUBES AIR INFLATION TESTS

92. (1) Every inflated rescue boat with all its valves, deflation plugs and fittings shall be inflated to 17.78 grammes/cm^2 (177.8mm water gauge) above the maximum blow-off pressure of the relief valves, the valves being plugged, and allowed to stand for 30 minutes.

(2) After the procedure described in subsection (1) has been carried out,

(a) the pressure in the inflated boat shall be adjusted to the designed working pressure of the relief valves and the pressure drop after 60 minutes corrected for any temperature change in accordance with subsection (3) shall be recorded; and

(b) where a buoyancy chamber of the inflated boat is subdivided by bulkheads or diaphragms, the pressure in each compartment shall be adjusted to the designed working pressure of the relief valves and the pressure drop after 15 minutes corrected for any temperature change in accordance with subsection 3 shall be recorded.

(3) The results of the pressure drop readings of the air inflation tests shall be corrected for any variation of the temperature in the vicinity of the boat during the test, within a permissible limit of 3°C as follows

(a) if there is a temperature rise, 0.0004 kg/cm^2 (38mm water gauge) shall be subtracted for every degree celsius; and
(b) if there is a fall in temperature, 0.004kg/cm^2 (38mm water gauge) shall be added for every degree celsius.

(4) The maximum permissible corrected drop in pressure referred to in paragraphs 2(a) and (b) shall not exceed 2.54 grammes/cm^2 (25.4mm water gauge) from the designed working pressure.

(5) Tests of other inflatable chambers such as thwarts or keels as applicable shall be as specified in the manufacturer's construction specifications for the boat.

(6) Where, during a manometer pressure test of an inflated rescue boat, the ambient temperature varies more than 3°C, the results of the test shall be disregarded and the tests shall be repeated.

CORDAGE, WEBBING and THREAD

93. (1) All cordage, webbing and thread used in the construction of an inflated rescue boat or in the make-up of fittings or equipment, shall be

(a) specified in detail in the specifications submitted to the Board for approval; and
(b) either inherently rot proof or rot proofed by a process approved by the Board.

(2) All cordage shall be attached to the boat in such a manner that if the cordage is accidentally detached, the buoyancy tubes will not be damaged.

LAPS and SEAMS

94. (1) Full details of the proposed method of joining panels of the fabric of which an inflated rescue boat is to be constructed shall be submitted to the Board.

(2) If an adhesive solution is to be employed in joining panels of the fabric of which an inflated rescue boat is to be constructed, a full description including composition, directions for storage, mixing, application and tests to be applied shall be submitted to the Board.

(3) During construction of a prototype inflated boat, three samples of typical panel joints forming an inflatable chamber, manufactured with production materials, adhesives and techniques shall be tested for compliance with the requirements of subsections 87(1) and (2).

(4) The external sight edges of transverse seams shall face aft and the external sight edges of longitudinal seams inboard.

(5) All exposed seams shall be taped externally.

QUALITY CONTROL

95. The manufacturers of inflated rescue boats shall submit a detailed description of the quality control procedure used in the construction of inflated rescue boats to the Board for consideration and acceptance.

PRODUCTION INSPECTIONS

96. (1) The manufacturer shall ensure that production inspections described in the manufacturer's accepted quality control procedures are performed to the satisfaction of the Board.

(2) The manufacturer shall keep records showing:

(a) source and type of materials, components and invoice numbers;
(b) acceptance of conformity of materials and components to this Standard;
(c) quantity of supplies received;
(d) quantity of supplies used by number of boats constructed;
(e) balance of supplies on hand; and

(3) All records listed in paragraphs (2)(a) to (2)(e) inclusive shall be made available on demand to an inspector.

(4) An inspector shall be satisfied, by examination of invoices that the materials are in accordance with the provisions of approval.

MAINTENANCE and REPAIRS

97. Maintenance and repairs to inflated rescue boats shall be carried out in accordance with the instructions in the manufacturer's maintenance and repair manual.

98. Emergency repairs may be carried out on board ship but permanent repairs shall be effected at an approved servicing depot.

OPERATIONAL READINESS

99. Every inflated rescue boat shall be maintained at all times in a fully operational condition and ready for use in case of an emergency.

PART IV

INFLATED RESCUE BOATS WITH RIGID HULLS (Additional Requirements)

CONSTRUCTION, BUOYANCY and REPAIRS

100. The rigid hull structure of an inflated rescue boat shall meet the material requirements referred to in sections 72 and 73 for a rigid rescue boat.

101. The rigid hull structure of an inflated rescue boat shall have inherent buoyancy or shall be fitted with inherently buoyant material sufficient to float the rigid hull structure.

102. The inherent buoyancy material referred to in section 101 shall meet the requirements of section 77 for a rigid rescue boat.

103. An inflated boat with a rigid hull shall meet
(a) all the requirements of Part III to these Standards; and
(b) the requirements of section 80 for a rigid rescue boat.

SCHEDULE I

RETRO-REFLECTIVE TAPE

A - RIGID RESCUE BOATS

1. (1) Every rigid rescue boat shall have affixed to it retro-reflective tape that is

(a) manufactured in accordance with CGSB Specification No. 62-GP-11 or 62-GP-12 for all rigid surfaces, and 62-GP-12 for all flexible surfaces; and

(b) arranged as shown in the following diagrams.

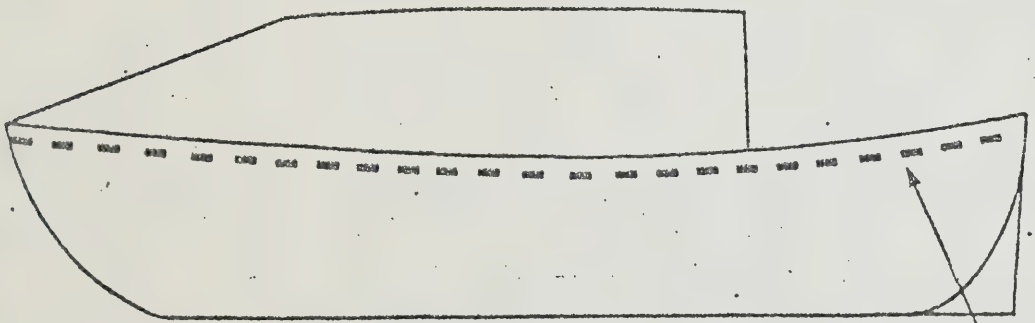


DIAGRAM 1 SIDE
DIAGRAMME 1 VUE LATÉRALE

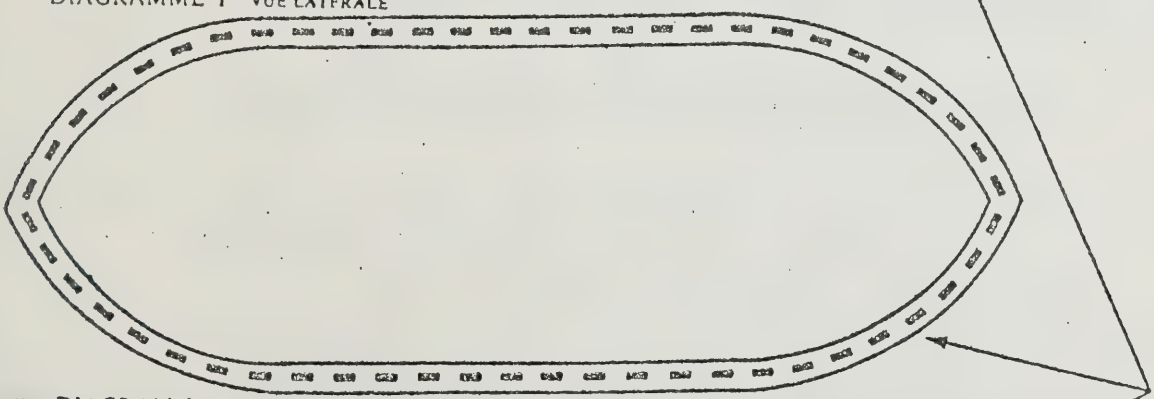


DIAGRAM 2 PLAN — OPEN BOAT
DIAGRAMME 2 PLAN — EMBARCATION NON PONTÉE

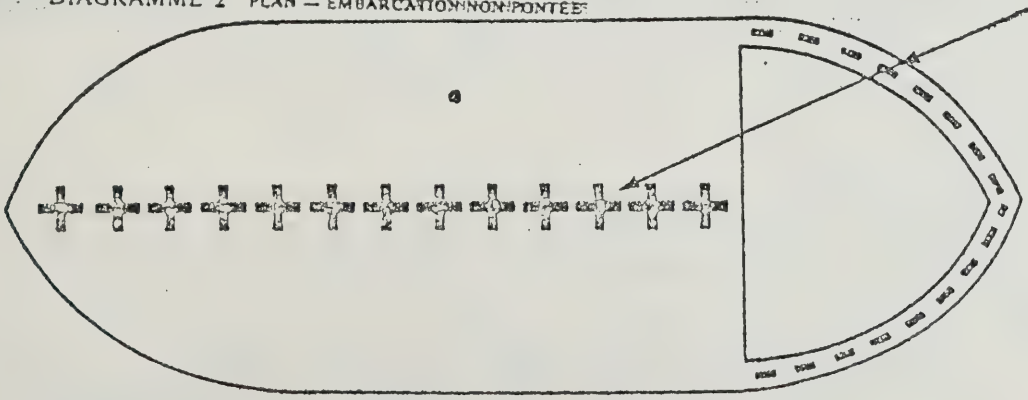


DIAGRAM 3 PLAN — WITH CANOPY
DIAGRAMME 3 PLAN — EMBARCATION AVEC TENDELET

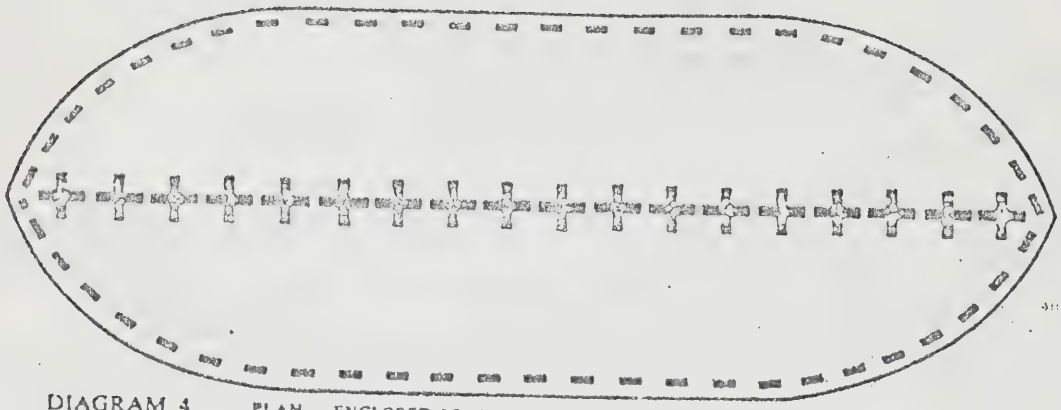


DIAGRAM 4 PLAN – ENCLOSED BOAT (RIGID TOP)
DIAGRAMME 4 PLAN EMBARCATION FERMÉE (CAPOT RIGIDE)

(2) The retro-reflective tape referred to in paragraph 1.(1)(a) shall be in sections

(a) not less than 50mm in width;

(b) not less than 300mm in length;

(c) so spaced that the distance between the centres of adjacent sections is not more than 500mm; and

(d) fitted

(i) on top of the gunwale as shown in the diagrams set out in that subsection;

(ii) on the outside of the rigid rescue boat as near the gunwale as possible, as shown in the diagrams set out in that subsection; and

(iii) on the top of the canopy or exposure cover, if fitted, in the form of crosses as shown in the diagrams set out in that subsection.

(3) The canopy or exposure cover, if fitted, shall not obscure the retro-reflective tape sections on the side of the rigid rescue boat.

B - INFLATED RESCUE BOATS

2. (1) The retro-reflective tape referred to in paragraph 1.(1)(a) shall, in the case of an inflated boat

(a) consist of

(i) in the case of the sides of the boat, sections measuring not less than 50mm in width and 150mm in length, and so spaced that the distance between the centres of adjacent sections is not more than 500mm,

(ii) in the case of the transom, two sections, each measuring not less than 100mm in width and 150mm in length,

(iii) in the case of the bow, two sections, the horizontal section measuring not less than 50mm in width and 600mm in length and the vertical section measuring not less than 50mm in width and 150mm in length,

(iv) in the case of the top of the boat,

(A) at least one set of two sections in the form of a cross on each side of the apron or canopy, and each section measuring not less than 50mm in width and 300mm in length,

(B) sections across each float measuring not less than 50mm in width and 150mm in length and so spaced that the distance between the centres of adjacent sections is not more than 500mm, and

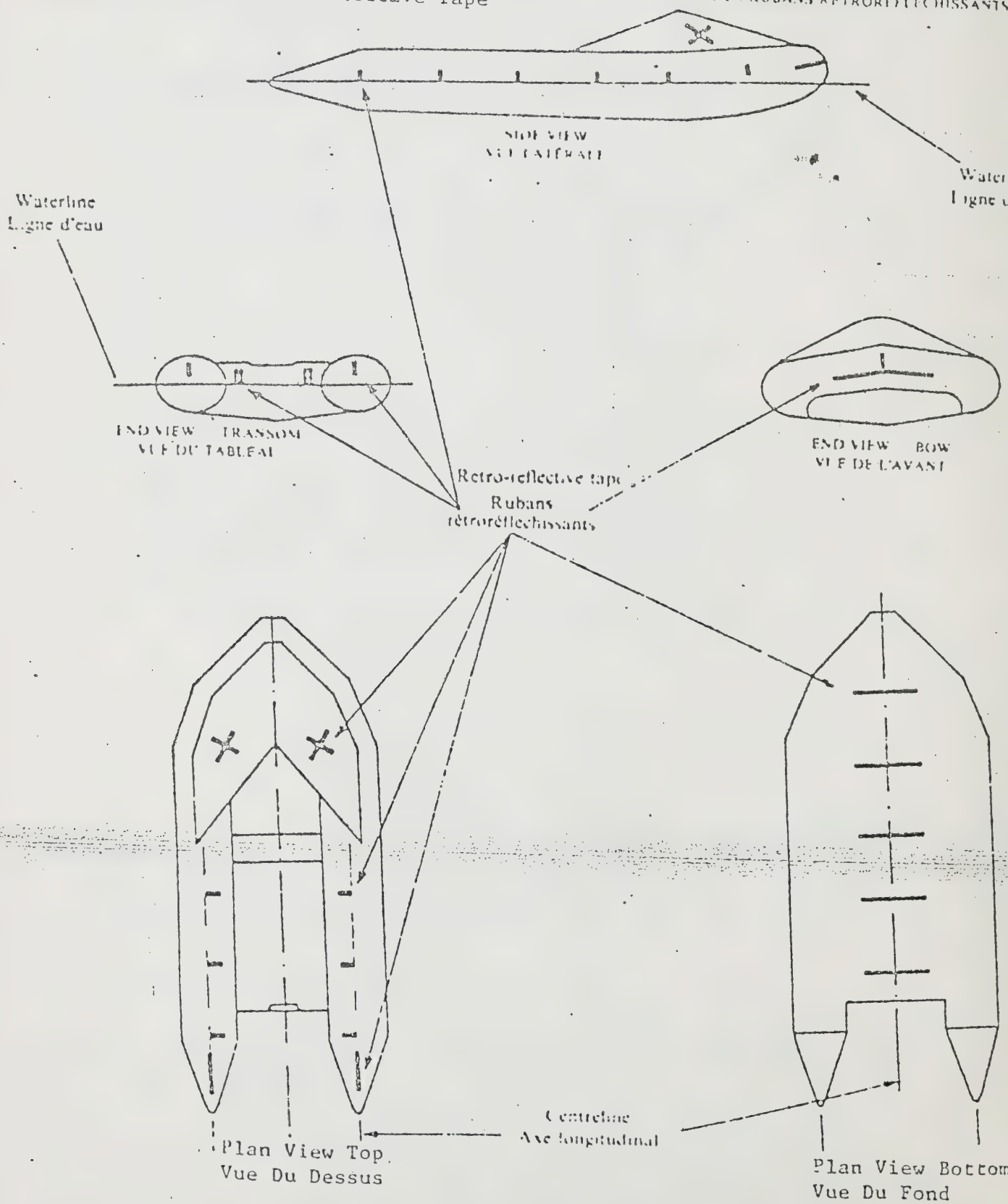
(C) a section at the rear of each float measuring not less than 50mm in width and 300mm in length, and

(v) in the case of the outer bottom of the boat, sections measuring not less than 50mm in width and 300mm in length and so spaced that the distance between the centres of adjacent sections is not more than 500mm; and

(b) be fitted as shown in the following diagram.

DIAGRAM
Typical Inflated Boat
Arrangement of Retro-Reflective Tape

DIAGRAMME
EMBARCATION DE TYPE PNEUMATIQUE
DISPOSITION DES RUBANS RÉTRORÉFLÉCHISSANTS



C - INFLATED RESCUE BOAT WITH A RIGID HULL

3. (1) Every inflated rescue boat with a rigid hull shall have affixed to it retro-reflective tape as referred to in paragraph 1.(1)(a).

(2) The retro-reflective tape referred to in paragraph 1.(1)(a) shall, in the case of the rigid hull of the boat, be in sections

(a) not less than 50mm in width;
(b) not less than 300mm in length;
(c) so spaced that the distance between the centres of adjacent sections is not more than 500mm; and
(d) fitted,
(i) on the outside of the rigid hull as near the inflated section as possible,
(ii) transversely on the outside of the bottom of the boat, on each side of the keel.

(3) The retro-reflective tape referred to in paragraph 1.(1)(a) shall, in the case of the inflated section of the boat

(a) consist of
(i) in the case of the sides of the boat, sections measuring not less than 50mm in width and 150mm in length, and so spaced that the distance between the centres of adjacent sections is not more than 500mm.
(ii) in the case of the transom, two sections, each measuring not less than 100mm in width and 150mm in length,
(iii) in the case of the bow, two sections, the horizontal section measuring not less than 50mm in width and 600mm in length and the vertical section measuring not less than 50mm in width 150mm in length.
(iv) in the case of the top of the boat
(A) at least one set of two sections in the form of a cross on each side of the apron or canopy, and each section measuring not less than 50mm in width and 300mm in length,
(B) sections across each float measuring not less than 50mm in width and 150mm in length and so spaced that the distance between the centres of adjacent sections is not more than 500mm, and
(C) a section at the rear of each float measuring not less than 50mm in width and 300mm in length,

(b) be fitted as shown in the following diagrams

DIAGRAM
Rigid SECTION

DIAGRAMME
Coque de Construction Rigide

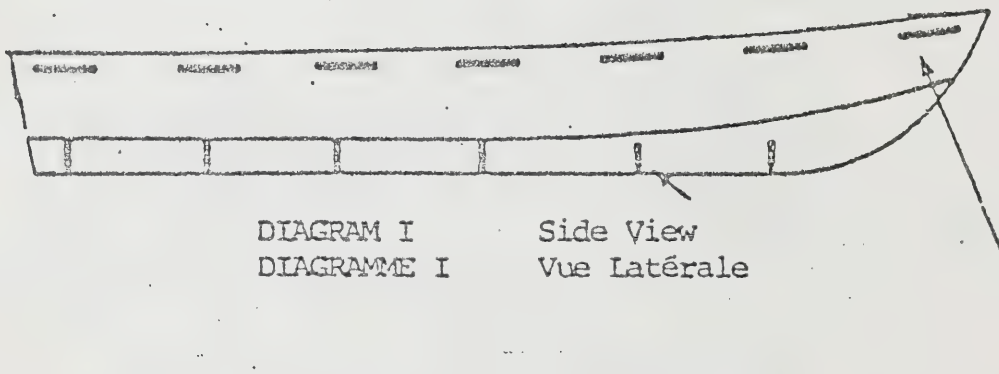


DIAGRAM I Side View
DIAGRAMME I Vue Latérale

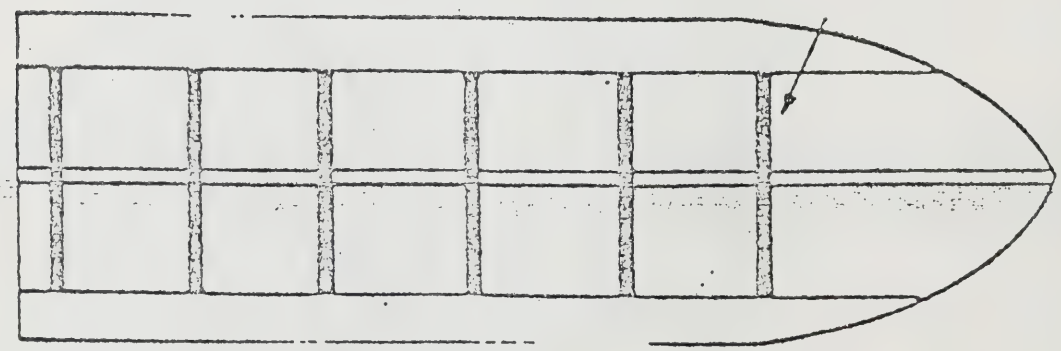


DIAGRAM 2 Bottom View
DIAGRAMME 2 Vue De Fond

SCHEDULE II

RESCUE BOAT EQUIPMENT

1. All items of rescue boat equipment, with the exception of boat hooks which shall be kept free for fending off purposes, shall be secured within the rescue boat by lashings, storage in lockers or compartments, storage in brackets or mounting arrangements, or other suitable means.

2. Equipment shall be secured in such a manner so as not to interfere with any launching or recovery procedures.

3. All items of rescue boat equipment shall be as small and of as little mass as possible and shall be packed in suitable and compact form.

4. (1) The normal equipment of every rescue boat shall consist of:

(a) sufficient buoyant oars or paddles to make headway in calm seas;

(b) thole pins, crutches or equivalent arrangements shall be provided for each oar; the thole pins or crutches shall be attached to the boat by lanyards or chains;

(c) a bailer

(d) a binnacle containing an efficient compass which is luminous or provided with suitable means of illumination;

(e) a sea anchor with a line of adequate strength not less than 10m in length;

(f) a painter of sufficient length and strength, arranged for quick release and placed at the forward end of the rescue boat;

(g) one buoyant line, not less than 50m in length, of sufficient strength to tow a liferaft in accordance with section 14 of these Standards;

(h) one waterproof electric torch suitable for Morse signalling, together with one spare set of batteries and one spare bulb in a waterproof container;

(i) one whistle or equivalent sound signal;

(j) a first aid outfit in a watertight case;

(k) two buoyant rescue quoits, attached to not less than 30m of buoyant line;

(l) a searchlight provided with an approved source of illumination which is capable of providing effective illumination of a light coloured object at night having a width of 18m at a distance of 180m for a total period of 6 hours and capable of working for not less than 3 hours continuously; and

(m) thermal protective aids sufficient for not less than 10 per cent of the number of persons the rescue boat is certified to carry or two, whichever is the greater number.

(2) In addition to the equipment required by subsection 4.(1) of this Schedule, the normal equipment of every rigid rescue boat shall include:

(a) a boat hook;
(b) a bucket; and
(c) a knife or hatchet.

(3) In addition to the equipment required by subsection 4.(1) of this Schedule, the normal equipment of every inflated rescue boat shall consist of:

(a) a buoyant safety knife;
(b) two sponges;
(c) an efficient manually operated bellows or pump;
(d) a repair kit in a suitable container for repairing punctures; and
(e) a safety boat hook.

SCHEDULE III

APPROVAL PROCEDURE

1. An application for approval of a rescue boat shall be sent to the

Director
Ship Safety Branch
Canadian Coast Guard
Place de Ville
Ottawa, Ontario
K1A ON7

CONTENTS OF APPLICATION

2. An application for approval of a rescue boat shall include the following

(a) Three sets of fully detailed boat plans;
(b) A description of the method of construction;
(c) Material specifications;
(d) The amount of inherent and/or air/gas buoyancy that will be provided;
(e) The weights of construction material and equipment;
(f) A description of the propulsion system;
(g) Details of the quality control procedure used in the construction of the boat;
(h) The names and addresses of manufacturers of construction component parts and where applicable the reference numbers or trade names of the components.

3. The Canadian Coast Guard reviews the contents of the application and advises the applicant whether it is acceptable.

TESTING ARRANGEMENTS

4. The applicant shall make arrangements for the approval tests directly with the Canadian Coast Guard or as applicable with an independent laboratory that is recognized by the Canadian Coast Guard to conduct such tests.

5. The applicant shall ensure that an independent laboratory is recognized by the Canadian Coast Guard by contacting the Canadian Coast Guard for written affirmation before making test arrangements.

6. Each approval test shall be conducted in accordance with the requirements of these Standards.

INDEPENDENT LABORATORY

7. To be an independent laboratory, a laboratory shall

(a) be engaged in testing marine materials and equipment;
(b) not be owned or controlled, by a manufacturer or vendor of rescue boats, or by a supplier of components to the manufacturer; and
(c) be recognized by Ship Safety Branch, Canadian Coast Guard, Ottawa, Ontario.

FINAL REVIEW AND APPROVAL

8. The Canadian Coast Guard reviews the test reports and advises the applicant whether the rescue boat is approved.

ANNEX H

RESCUE STUDY

Terms of Reference

Objective

To critically assess the present rescue capabilities and to identify methods whereby rescue capability could be improved.

Scope

During the next decade a considerable number of people will be working on the rigs and service vessels operating off the eastern coast of Canada in exploratory drilling operations. All aspects of the capability of Government and Industry to rescue persons involved in a major marine disaster (more than five persons) will be critically examined.

The study will examine the capability of rescuing persons from an oil rig, supply boat and helicopter under conditions to be expected off the coast of eastern Canada.

A critical examination will be made of Government SAR resources. This examination will include a critical examination of its mandate, its structure, its basic objectives and their underlying philosophy, the role of self-help, volunteer groups, a user-pay system, responsibility for rescue vs obligation to assist with reference to offshore incidents and to pleasure craft. The examination should include equipment, personnel, their quantity, quality and location in order to assess the ability of the SAR system to respond to emergencies under all weather conditions.

Similarly an examination will be made in depth of the capability of industry to deal with these emergencies. This examination will include a study of standby vessels and commercial helicopters and the rescue systems they should have if they are to participate effectively in rescue operations.

An analysis will be made of a sample of major distress incidents in recent years to illustrate what is required if success is to be achieved.

A critical examination will be made of the co-ordinated command structure required if the resources of Government and Industry are to be mobilized and utilized effectively to cope with a major disaster.

A critical examination of the Government and Industry major marine disaster plans will be made in their application to offshore exploratory drilling operation.

A comparative analysis will be made of rescue plans and provisions in North Sea.

The study will reach conclusions for future action by Industry and Government to improve the rescue should a major disaster occur in offshore exploratory drilling operations.